

## **FIRE REHABILITATION MONITORING OF BLM LANDS AFFECTED BY 1996 FIRES**

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Bureau of Land Management (Utah Fillmore Field Office)  
and The U.S. Forest Service (Rocky Mountain Research Station Shrub  
Sciences Laboratory).**

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### **Executive Summary**

Permanent study transects and plots were constructed to monitor vegetation on BLM lands of central Utah affected by 1996 range fires. Intensive data on species composition and cover was collected from a total of 108 plots on seven study areas. Comparisons were made between lands that had been rehabilitated through chaining, drilling, or aerial seeding, and untreated or unburned lands. The success of rehabilitation measures in establishing perennial cover was greatest with drilling, followed by Ely chaining and smooth chaining, and least with aerial seeding alone. Variation due to local soils, topography, and plant distribution was detected among the study areas and plots. Preliminary data summaries and results are presented, to be supplemented by future reports as research continues.

### **Introduction**

This report is a summary of field work done during the summer of 1997 for the fire rehabilitation monitoring study on lands of the U.S. Department of the Interior, Bureau of Land Management. Most of the field work was on lands administered by the Fillmore Field Office of the Richfield District, but some work was performed on the Beaver River Resource Area administered by the Cedar City District. In collaboration with BLM personnel, researchers at the Rocky Mountain Research Station Shrub Sciences Laboratory at Provo, Utah, designed permanent study sites on rangelands in the pinyon/juniper and sagebrush zones, in or near areas that had been burned by the extensive 1996 fires (Fig. 1). Attempts had been made to rehabilitate these rangelands through aerial seeding followed by chaining, or by rangeland drill. Legal action by opponents of chaining had led to a halt of the chaining operation prior to its completion. As a result, these lands were left with mosaic of chained, drilled, seeded, and untreated areas.

The purpose of our study is to compare vegetation patterns and trends of these rehabilitated areas with those of nearby untreated and unburned lands. The BLM was especially interested in the establishment success of seeded perennial grasses, because of their role in reducing soil erosion and combating the exotic annual cheatgrass (*Bromus tectorum*). Our study set out to evaluate the extent of soil cover and relative abundances of these components of the vegetation, as well as all other vascular plant species.

A complementary study with a broader scope was carried out by Don Proctor of the Utah State Office of the BLM, in other burned areas of Utah's Fillmore, Cedar City, and Salt Lake districts.

### **Design**

Four base study areas were selected from among different burned areas on the BLM Richfield and Cedar City districts. The selection of these sites was based on visual suitability; preferred sites were those with several treatment classes within close proximity in an otherwise fairly uniform area. We also sought out sites with established markers such as public lands cadastral section corners, from which transects could be extended in a systematic way. The layout of these transects was subject to some manipulation so that the proper treatment classes could be compared without unnecessary variation. Extension of transects in cardinal directions or

compass angles ending in 0 or 5 was preferred. At all sites, the compass used was calibrated at 15 degrees declination from true north, regardless of actual site declination. Along the length of each transects, points were marked at even intervals of 50 meters or 60 meters (depending on the study area). Metal-rod markers placed at these points then served as the center of circular, 0.01 hectare (1/40 acre) sample plots. Four plots were included per treatment/transect. Each 0.01 ha. plot also contained a meter-square subsample plot, placed to the northeast of the circular plot center such that its edges were aligned with the cardinal directions. A second metal rod marks the northeastern corner of the meter-square in each plot. Figure 2 illustrates the dimensions of these plots.

The base study areas were assigned names--Cunningham, Twin Peaks, Gilson Mountains, and Jericho Highway--in reference to their geographic locations (Fig. 1, 3-7). Four treatment classes were sampled at each site: burned/seeded/chained, burned/seeded/not chained, burned/not seeded/not chained, and unburned/not treated. These were abbreviated, respectively, C (chained), NC (not chained), BNS (burned, not seeded), and I (intact). Parts of two of the study areas (Cunningham and Gilson Mountains) had been treated in rehabilitation projects prior to being burned in 1996. They were included in our sampling under the abbreviation OS (old seeding). The other two study area (Twin Peaks and Jericho Highway) had parts that had been burned and were subsequently treated with a rangeland drill (Dr).

In addition to these base study areas, three other study areas were established: Paul Bunyan's Woodpile (PB), Dog Valley Slopes (DS), and Railroad (RR) (Fig. 1, 8-10). These study areas allowed only for comparison of two treatments: burned/seeded/chained (C) and burned/seeded/not chained (NC). Transects were laid out at these study areas in parallel on the two sides of the dividing line between these treatments.

Figure 1 shows the approximate location of these study areas within the 1996 burns. Figures 3-10 consists of eight maps which illustrate the layout of treatments and transects at each of these study areas, in the following order: 3 and 4-Cunningham, 5-Twin Peaks, 6-Gilson Mountains, 7-Jericho Highway, 8-Dog Valley Slopes, 9-Paul Bunyan's Woodpile, 10-Railroad. A written description of each study area layout can also be found on Tables 1-7, following this same sequential order for study areas.

### **Data Collection**

For each 0.01 ha. plot, measurements of slope and aspect were taken, and a brief description made. General extent of erosion and grazing activity were described. Vascular plant species within each plot were inventoried, their sociability described, and assigned percentage cover values as follows: <1% = +; 1-5%=1; 6-25%=2; 26-50%=3; 51-75%=4; 76-95%=5; >95%=6. Sociability of each species in a plot was also described using the following code: Cover was also measured (as a percentage rather than a class) for vascular plants, bare soil, litter, rock (>1cm), and cryptogams. Such measurements were ocular estimates based on a reference frame of one square meter, equal to one percent of a plot.

Vascular plant cover was divided into two categories: overstory (trees) and understory (shrubs, grasses, and forbs). While overstory vascular cover was an independent category, understory vascular cover was linked to bare soil, litter, rock, and cryptogams; i.e., the total of these latter five categories was made to equal 100% at each plot. Meaning, for example, that litter beneath the understory vascular cover was not normally counted in the litter cover estimate. On burned plots, this system was generally adequate because of limited litter and cryptogam cover. On unburned plots, however, this system had to be modified because of extensive overlap in the vascular, litter, and cryptogam categories. These three categories were measured independently at such plots, giving total understory cover values of greater than 100%, the extra values indicating overlap.

In unburned plots with live trees (juniper, pinyon, or oak), the overstory cover category was measured as the percentage of ground lying beneath the tree canopy. In burned plots, an analogous measurement, labeled "standing dead," was taken. Canopy provided by the burned tree skeletons was estimated as if they were living and foliated. In chained plots, these estimates reflect the canopy cover of the trees in their felled position. Portions of the burned trees on or touching the ground were considered part of the litter class. Herbaceous plant material of the current year was not considered part of the litter component as long as it was still rooted in place.

A second set of cover class estimates deals with vascular plant cover alone. The relative amount of cover provided by trees, shrubs, grasses, and forbs was calibrated to a total of 100% (*not* the same as the 100%=0.01 ha. of the previously mentioned set of cover classes). Only living woody plants and herbaceous plants of the current year were included here. In burned plots, where herbaceous cover or small shrubs predominated, these categories were readily exclusive. Unburned plots, with their extensive overstories and understories, had to be treated as if the different stories were pulled apart before collectively adding up to 100%.

Grass cover was further subdivided into exotic, native, and seeded species; again, calibrated to a total of 100%. The exotic category refers to cheatgrass. Commonly encountered native grasses included bottlebrush squirreltail (*Sitanion hystrix*), Bluebunch wheatgrass (*Agropyron spicatum*), Western Wheatgrass (*Agropyron smithii*), and Indian ricegrass (*Oryzopsis hymenoides*). At the Cunningham study area, Indian ricegrass had been included in the seeding mixture, thus it was included in the seeded category whenever encountered there. Seeding mixtures varied in composition at each study area, but contained similar grasses, mainly crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Agropyron intermedium*), tall wheatgrass (*Agropyron elongatum*), and smooth brome (*Bromus inermis*).

Data collection was more intensive for the meter-square plots within each 0.01 ha. plot. The number of individual plants of each species within the meter-square was counted (or, whenever more than about 60 plants of a species occurred in a plot, a round estimate was made). Perennial grass clones were usually counted as multiple individuals according to the clumping patterns of their stems. Cover percentages were assigned to each species on the principle that one

decimeter-square equals one percent. Cover percentages for understory (vascular plants, litter, bare soil, rock > 1cm, cryptograms) and overstory (live tree/standing dead canopy) were likewise recorded, with total understory cover equal to 100%, as in the larger plots.

Table 8 is an example of a completed datasheet, showing how the data appear when summarized, for the representative plot JH-C-P4. The first page has site notes, species occurrence, and cover data for the 0.01 ha. plot. The second page shows species occurrence and cover data for the meter-square subsample. The complete set of datasheets is not yet fully processed and will appear in a future report.

The recorded data is supplemented by photographs of each study plot. A close-up, semi-overhead view was taken of each meter-square. The 0.01 ha. circular plots were photographed from a distance of two radii from the plot center (one radius=5.66m) Two such photographs were taken at each plot, viewing the plot from two different angles, usually 90 degrees apart (e.g., viewed from the north and from the east). Figure 11 shows copies of the three photo views for the representative plot described in Table 8, JH-C-P4. Other photos, illustrating points made in the text below, are shown in Figures 15-24. Note that in some photographs, a colored ribbon was laid along the ground to mark the boundaries of the circular plots. A white quadrat marks the location of the meter-square plots. A full set of photographs representing all plots is on file at the Shrub Sciences Laboratory.

## Results and Discussion

Below the written descriptions of each study area on Tables 1-7 is a list of vascular plant species; i.e., those species recorded in study plots across all treatments of the study area. Tables 10-15 summarize cover data for all plots (both 0.01 ha. and m<sup>2</sup>), as well as transect means for these values. Some of these means, in turn, are represented graphically in Figures 12-14. The three columns of bar graphs shown in each figure correspond to the three sets of cover classes recorded for the 0.01 ha. plots: *% Cover by Type*, *% Vascular Plant Cover*, and *% Grass Cover*. Each set of cover values has a total of 100%, as explained above, but this percentage has an absolute value of 0.01 ha. only for the first column, *% Cover by Type*. The rows of graphs in Figures 12 and 13 correspond with the four principal study areas (Cunningham, Twin Peaks, Gilson Mountains, and Jericho Highway), illustrating mean cover values across the five treatments at each location. Figure 14 is a different arrangement of mean cover data, comparing chained transects (top row) against unchained transects (bottom row) across all seven study areas.

The discussion that follows is based on a visual analysis of the data and on the observations and impressions of the data collectors. A more detailed statistical analysis is planned.

At each study area, the assemblage of plant species encountered was unique, due to local floristics and the different seed mixtures used in these locations. Nevertheless, there was much similarity in the dominant plant taxa and in the response of the seeded species to different treatments. Seedling establishment success was greatest with drilling, moderate with chaining,

and least without mechanical treatment. Areas which had been aerially seeded but not chained generally had at least some seedling establishment. Seeded grasses such as crested wheatgrass were frequently encountered beneath burned tree skeletons in unchained areas, although the amount of cover provided in these cases was usually low (Fig. 15). A notable exception, in which such cover was high, occurred on the rocky, east-facing “burnt slopes” at the Cunningham site. Here, establishment of both seeded grasses-- crested and intermediate wheatgrasses--and seeded forbs--alfalfa (*Medicago sativa*), yellow sweetclover (*Melilotus officinalis*), and small burnet (*Sanguisorba minor*) was high despite no mechanical treatment (Fig. 16). These steep (25%-35%) slopes had been undergoing sheet and rill erosion following the fire. Our hypothesis is that the soil flow over and around the rocks caused much of the seed to be buried, thus increasing the number of successful germinations.

On the lower, flatter portion of Cunningham, mechanical treatment was carried out with a smooth chain. Prostrate kochia (*Kochia prostrata*) was among the plants that had been seeded here, and was abundant on the open ground of the chained area (Fig. 17). The response of the seeded grasses was different, in that their best establishment occurred underneath the felled trees. The germination success would in this case appear to be related more to the “nurse effect”--the modified microclimate due to the overlying tree skeleton--than to the mechanical manipulation of the soil seedbed (Fig. 18).

At all other study sites besides Cunningham, chaining was done using an Ely chain, and the mechanical impact on the soil was therefore more intense. Ely chains have sections of iron rails welded periodically to the chain links. At Paul Bunyan’s Woodpile, plot four of the chained transect was especially affected by a deep churning; here the seeded shrub fourwing saltbush (*Atriplex canescens*) had its greatest establishment and growth (Fig. 19). Generally, the seeded grasses also responded to Ely chaining with widespread establishment and vigorous growth. However, at some locations such as the Gilson Mountains, establishment was irregular, with patches of ground having low seeded grass cover (Fig. 20). Cover of seeded species was higher in drillings than in chainings at both the Twin Peaks and Jericho Highway sites (Fig. 21).

Some areas, seeded grass cover was complemented by a considerable complement of native perennial grasses. The north-facing Dog Valley Slopes were one such area; the low ground near a wash at GM-C-P1 was another (Fig. 22). At these locations, chaining did not appear to have any adverse effect on the recovery of these native grass stands following the fire. Cheatgrass, on the other hand, usually had less success on chained ground than on nearby unchained ground; the Railroad site is a prime example (Fig. 23). The reduction in cheatgrass may have been due to seed burial by the chaining activity.

The soil in chained and drilled areas tended to have a different appearance than nearby undisturbed soil, not only because of its more irregular topography but because of its finer surface texture; i.e., the rocky pavements found elsewhere had been buried at the treated sites. Particularly noteworthy was the Twin Peaks area, which sits on Quaternary basalt flows and is characterized by large rock fragments at the surface. Here, the chaining increased the amount of

exposed soil because these rocks were overturned and scattered (Fig. 24).

At many of the sites, total vascular plant cover was higher in unchained areas, whereas chained areas had more bare soil. As noted, however, cover by seeded species was higher in chained areas, and native perennial grasses were patchily distributed on both chained and unchained ground. The presence of more cheatgrass and forbs in the unchained areas was the contributing factor to such higher overall cover. Cover was lower under burned trees in the unchained areas, where the soil was often bare, except for the newly-established, aerially-seeded plants, as noted previously.

Diversity of plant species varied among treatments and was typically higher in burned areas than in unburned areas and higher in unchained areas than chained areas (drillings and old seedings were variable). The most dominant and prevalent forbs encountered were coyote tobacco (*Nicotiana attenuata*), desert alyssum (*Alyssum desertorum*), prickly lettuce (*Lactuca serriola*), and common sunflower (*Helianthus annuus*).

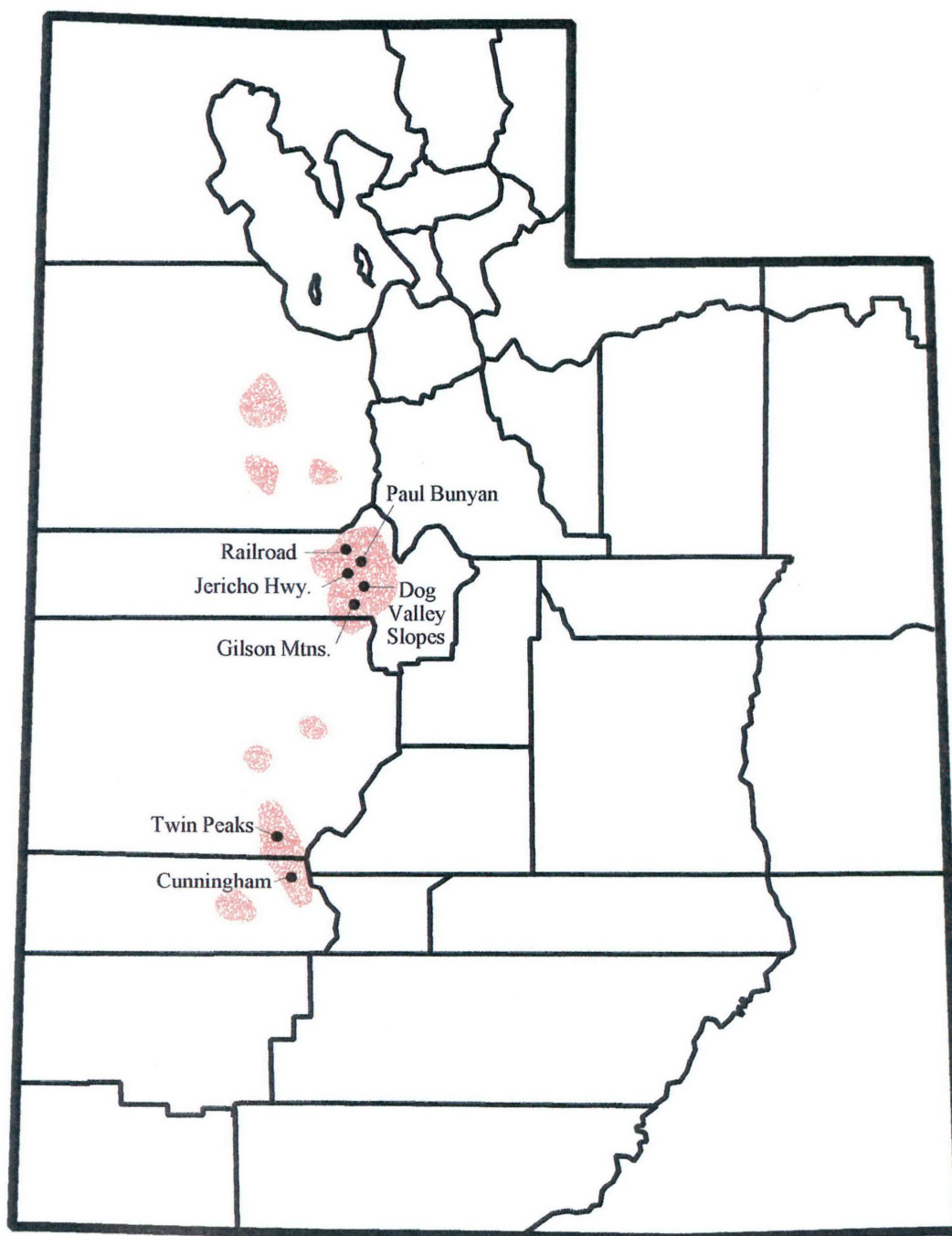
### **Projections**

A more complete, refined treatment of our results and conclusions will appear in a future report. Repeated data collection at all plots is also programmed for the 1998 and 1999 field seasons. According to available time and resources, additional data on cover, soil erosion, and floristics is likely to be collected during these field seasons.

### **Acknowledgments**

This project was funded by the U.S. Department of the Interior, Bureau of Land Management. We thank BLM personnel from the Utah State Office and the Fillmore Field Office. In particular, Earl Hindley, John Shive, Don Proctor, Pat Fosse, and Harvey Gates, each helped us with administrative and field phases of this study. Dr. Kimball Harper of Brigham Young University also provided valuable technical advice.

**Figure 1.** Locations of study areas on land affected by 1996 range fires (red shading).



**Figure 2. Dimensions of Study Plots**

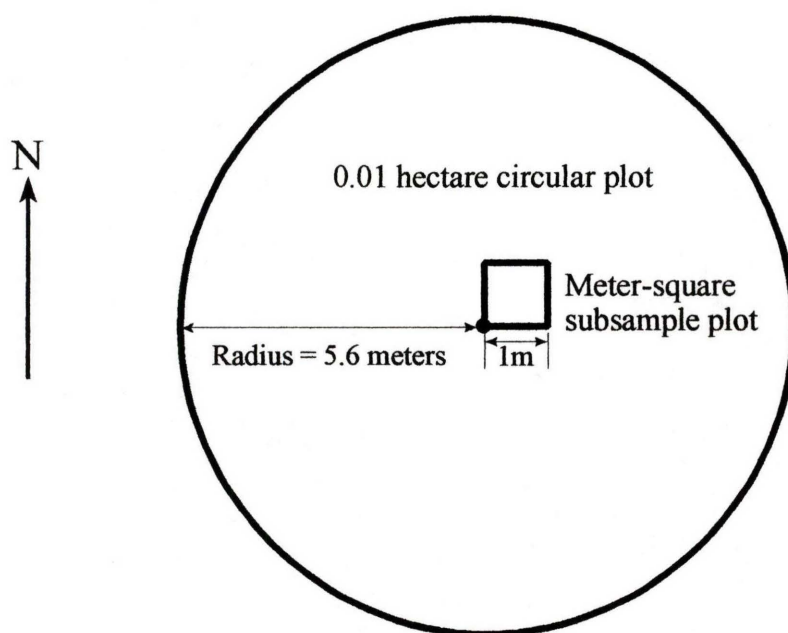


Figure 3. CUNNINGHAM STUDY AREA  
EAST TRANSECTS

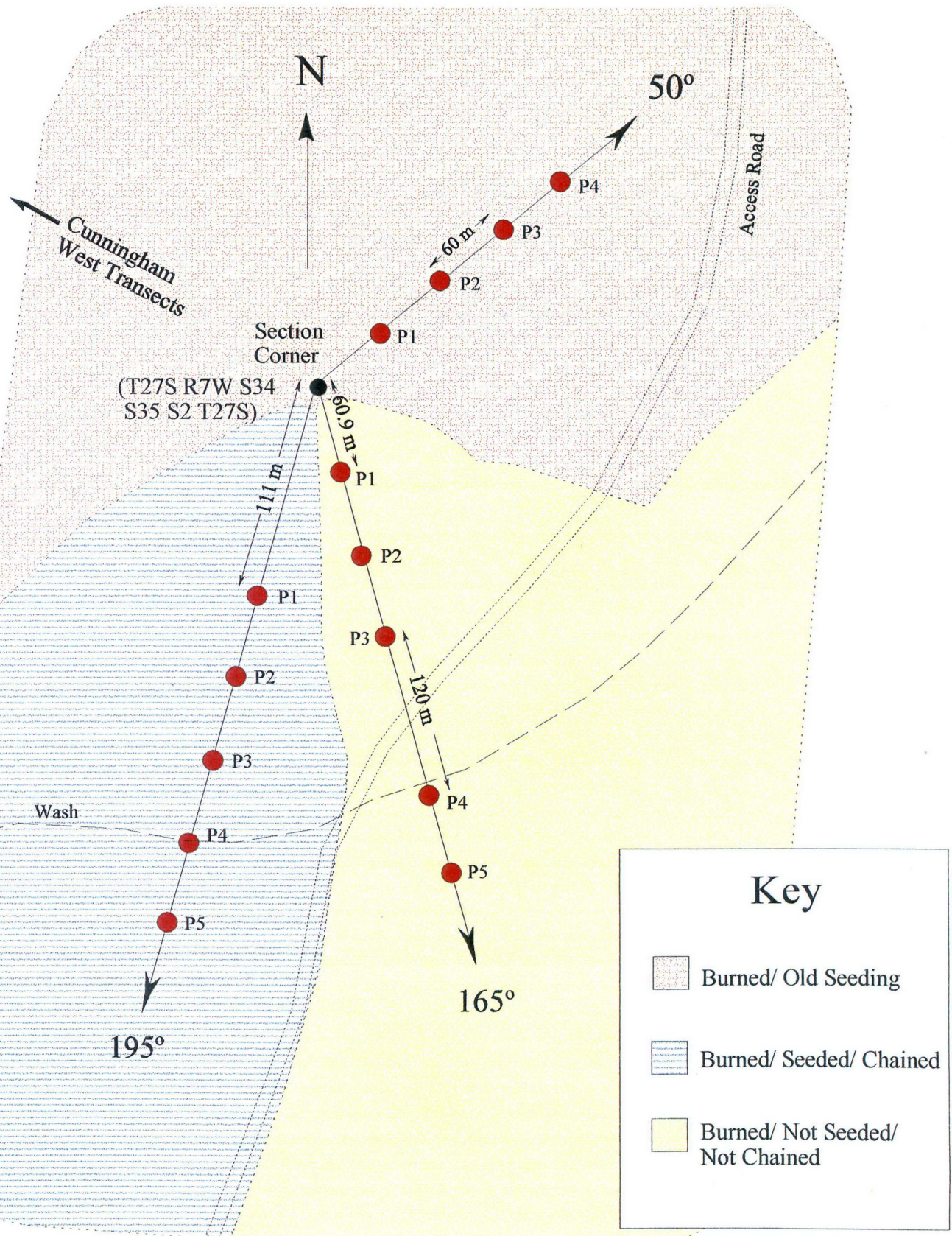


Figure 4. CUNNINGHAM STUDY AREA  
WEST TRANSECTS

10

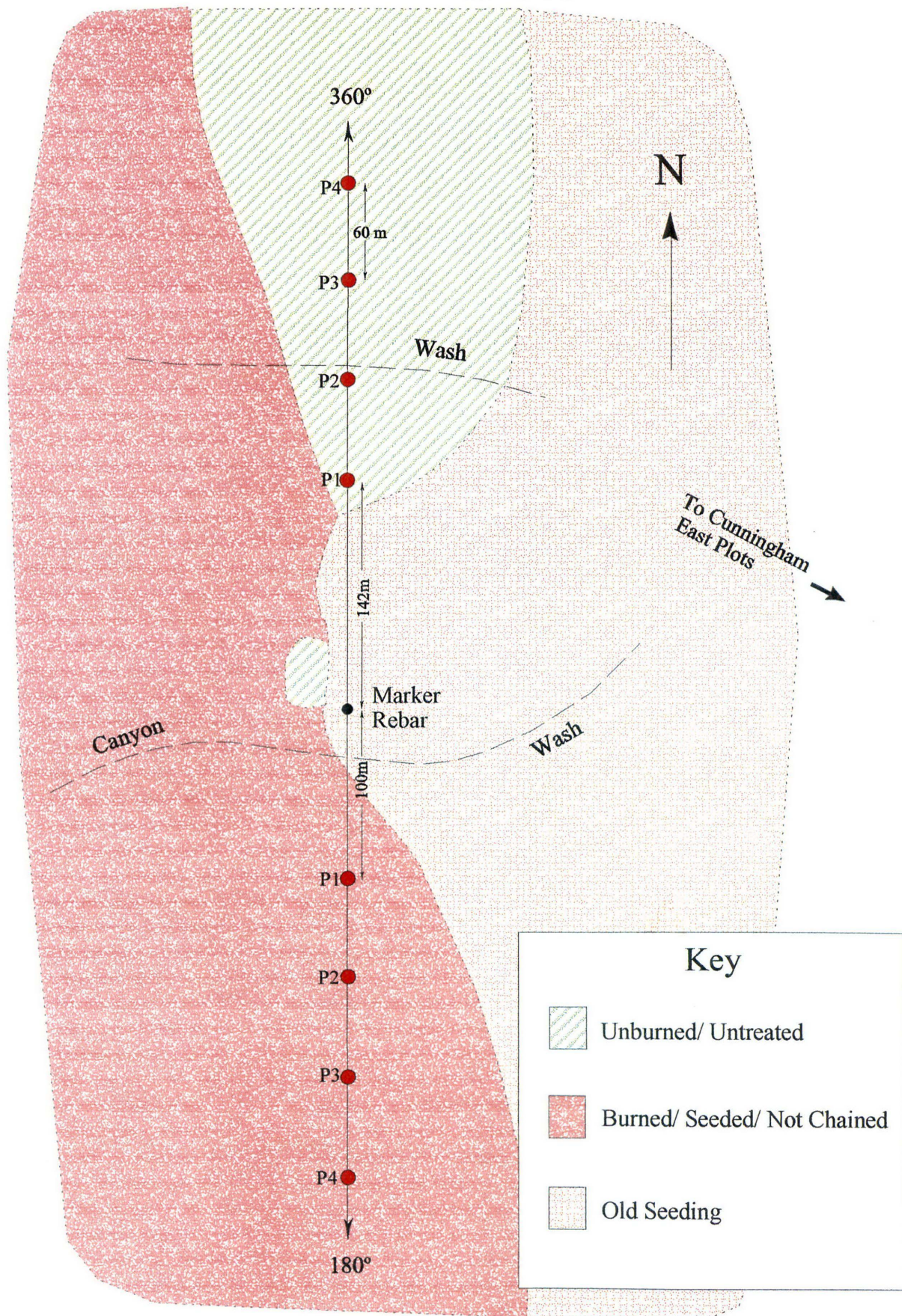


Figure 5. TWIN PEAKS STUDY AREA

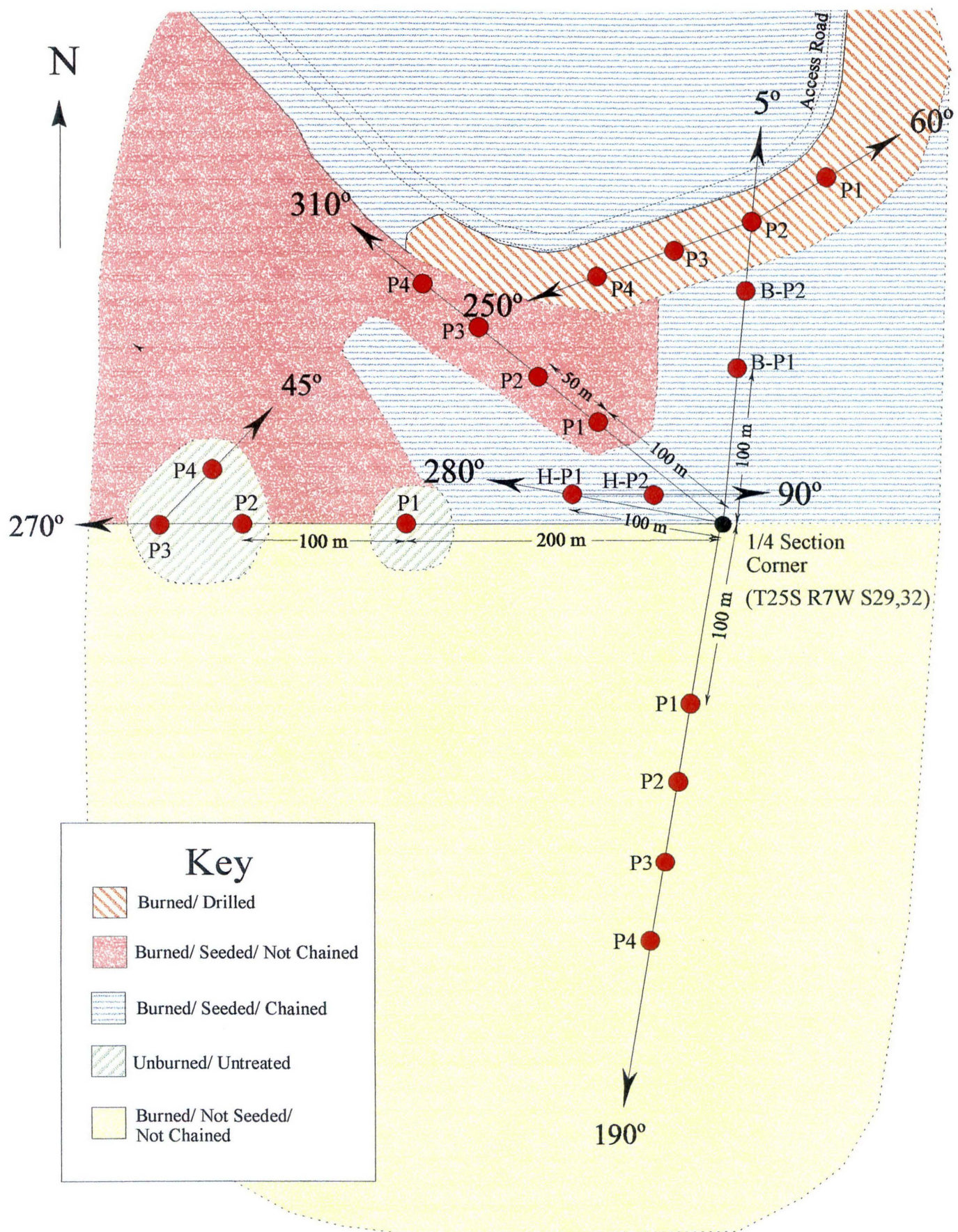
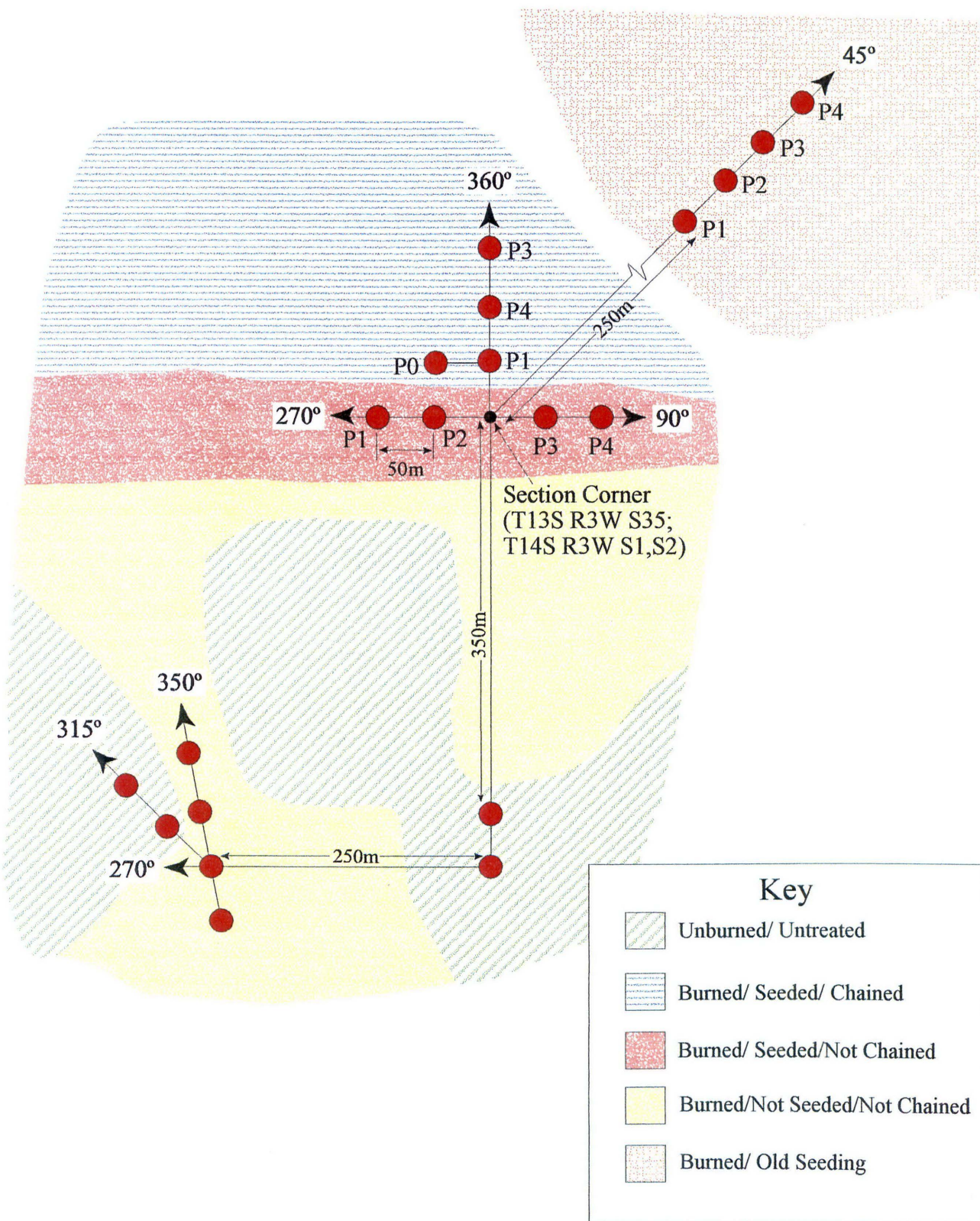


Figure 6. GILSON MOUNTAINS STUDY AREA



13

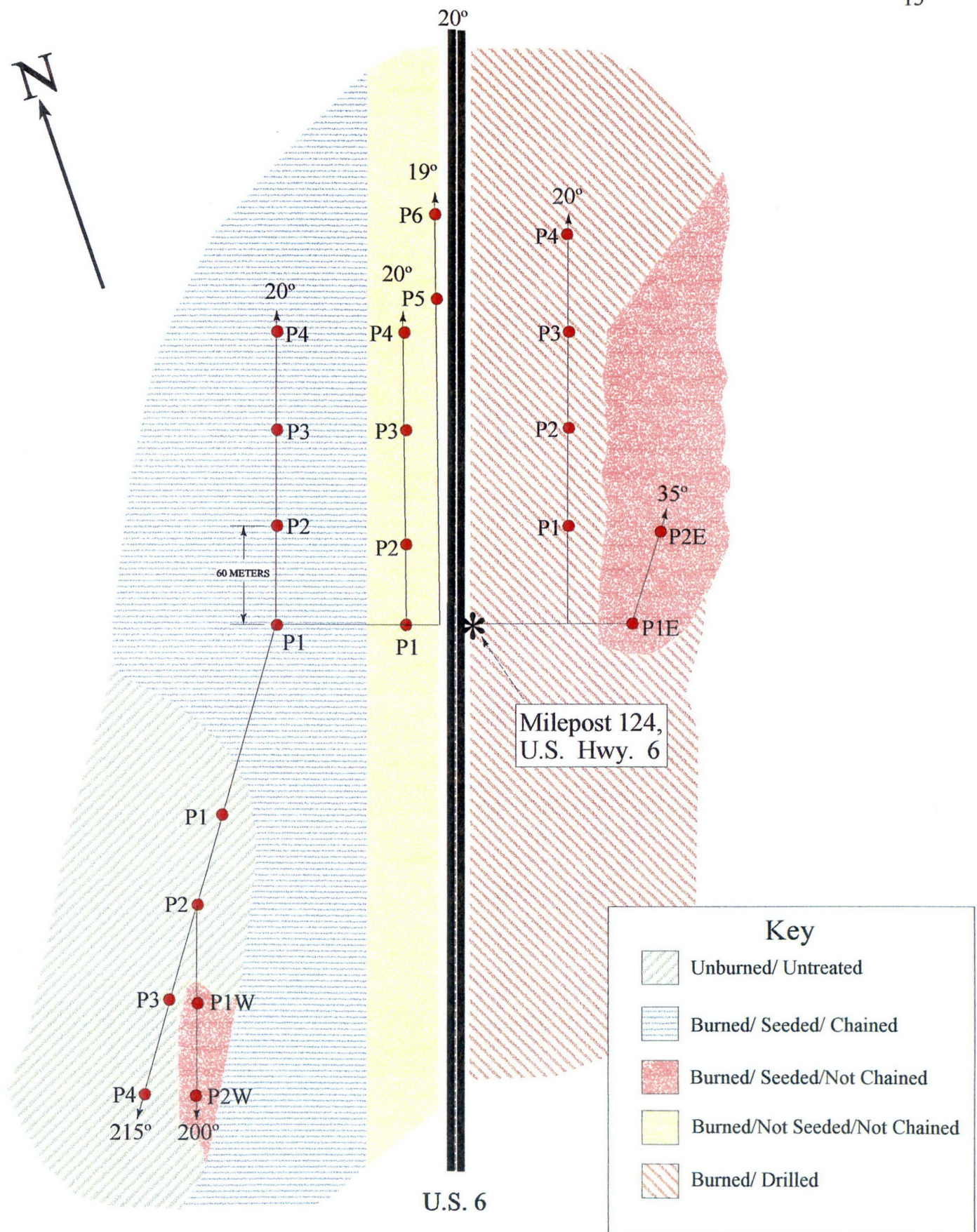


Figure 8. DOG VALLEY SLOPES  
STUDY AREA

14

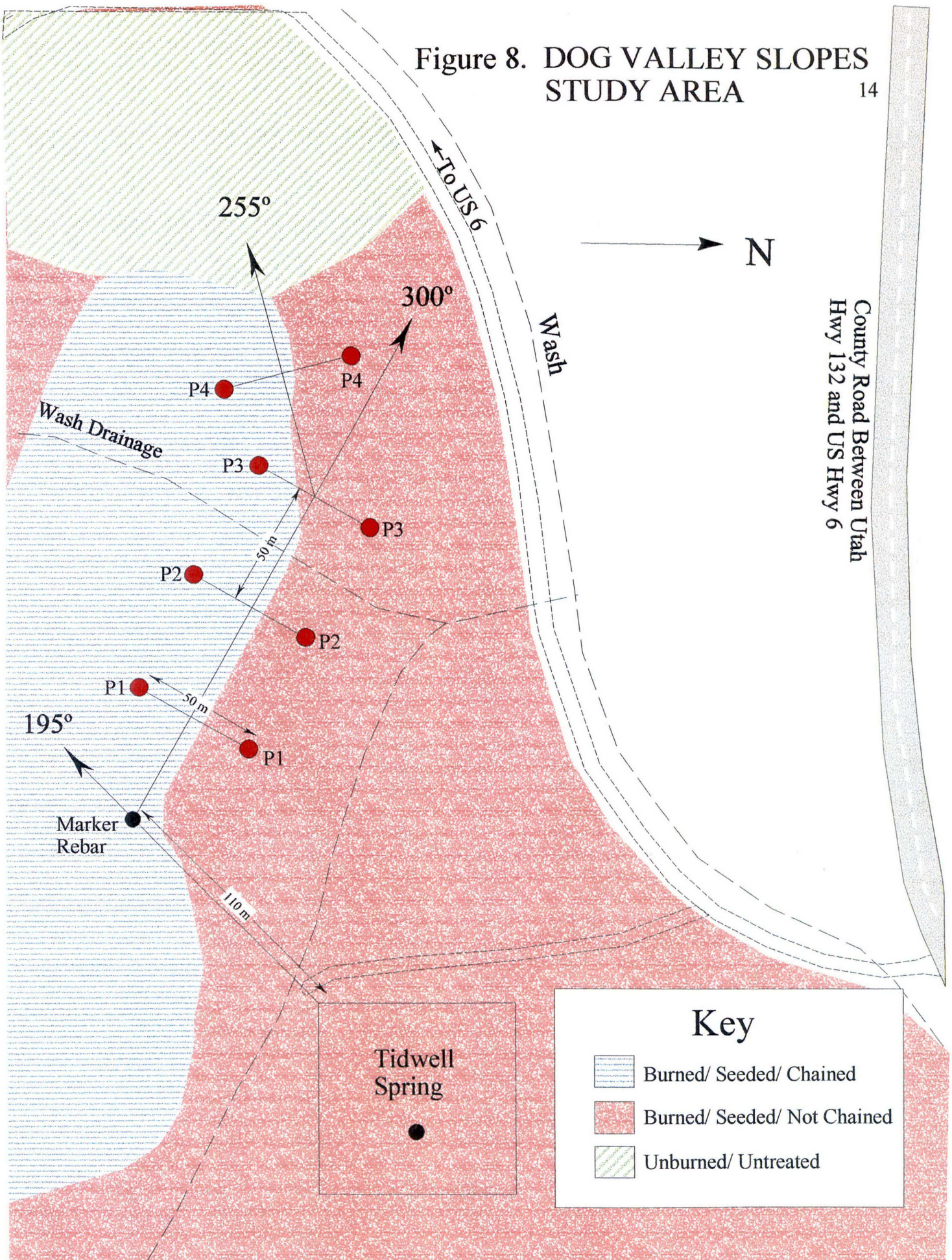
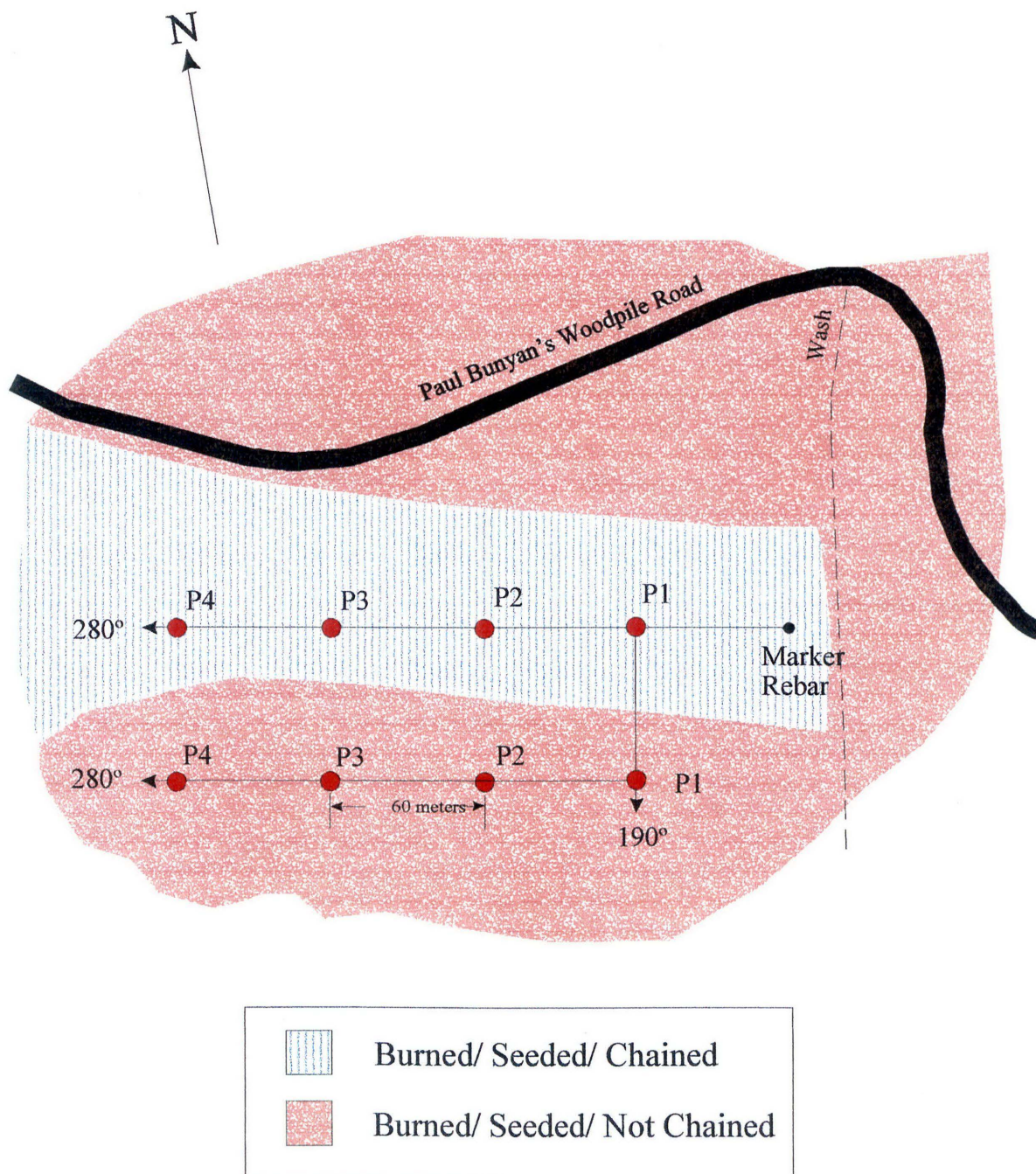


Figure 9. PAUL BUNYAN'S WOODPILE STUDY AREA



# Figure 10. RAILROAD STUDY AREA

16

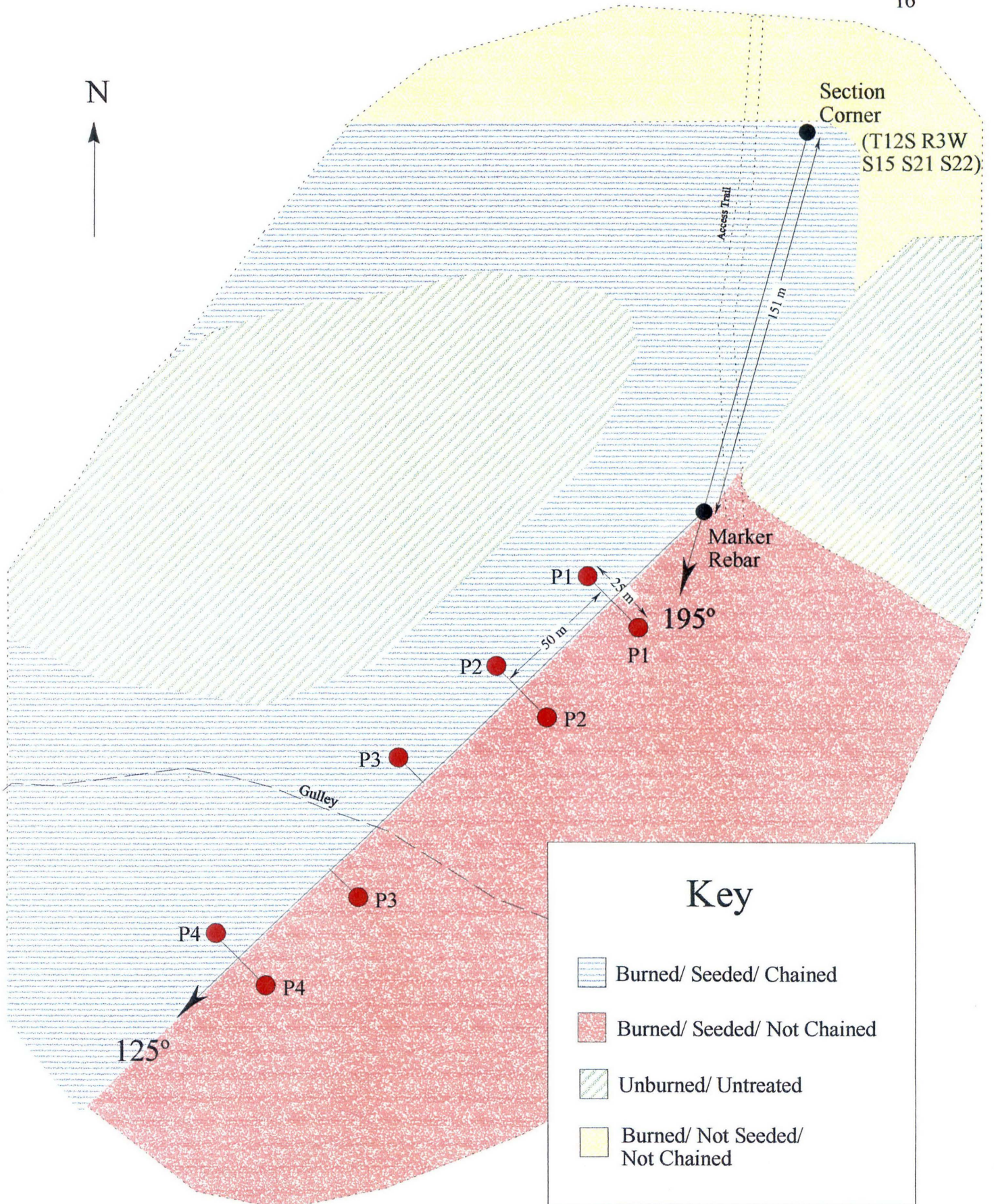


Figure 11. Photographs of a representative plot, JH-C-P4 (Jericho Highway-Chained-Plot 4), showing two views of 0.01 plot and closeup of meter-square plot inside.

17

View  
from  
North  
(8-29-97)

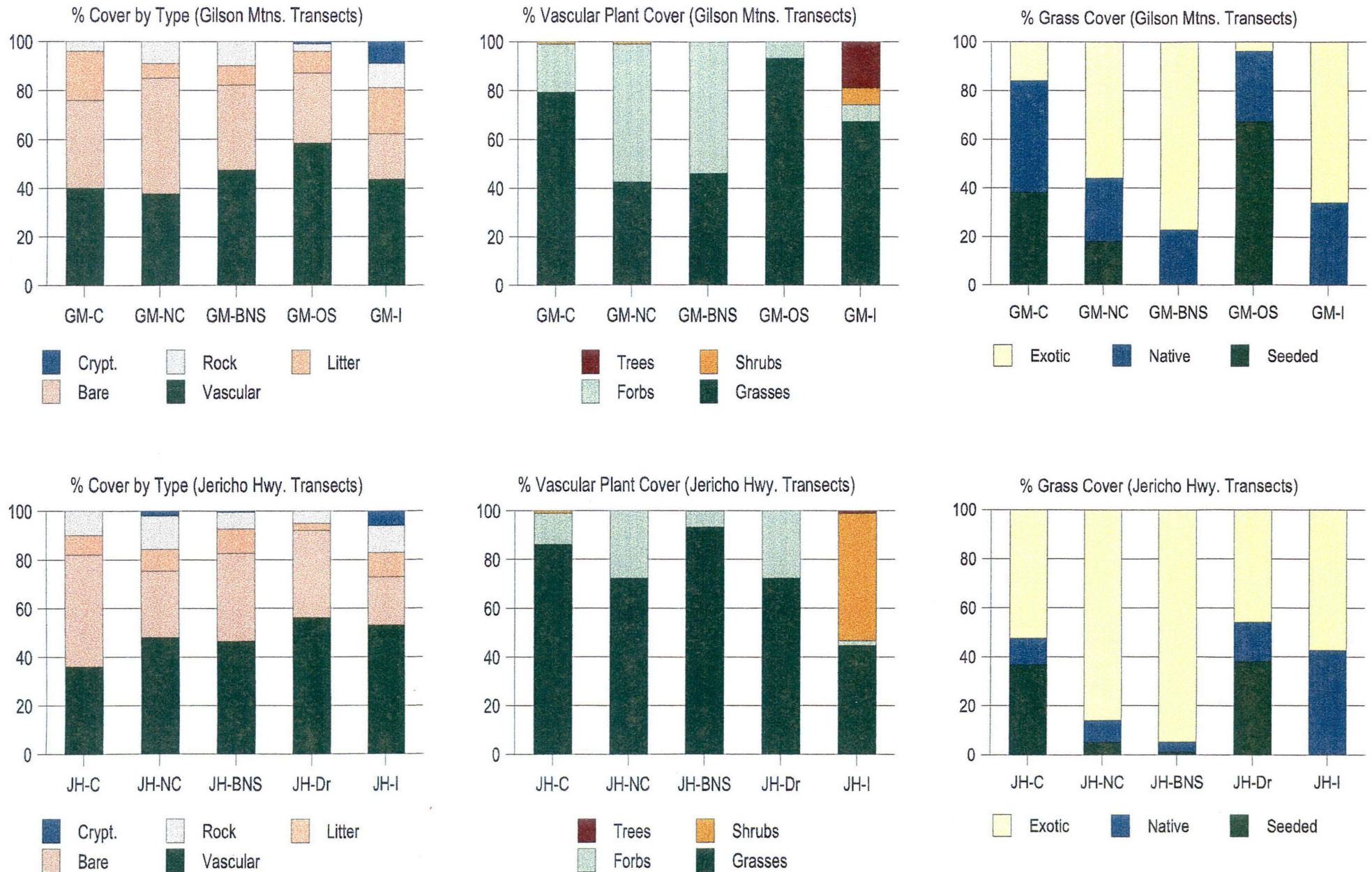


View  
from  
West  
(8-29-97)

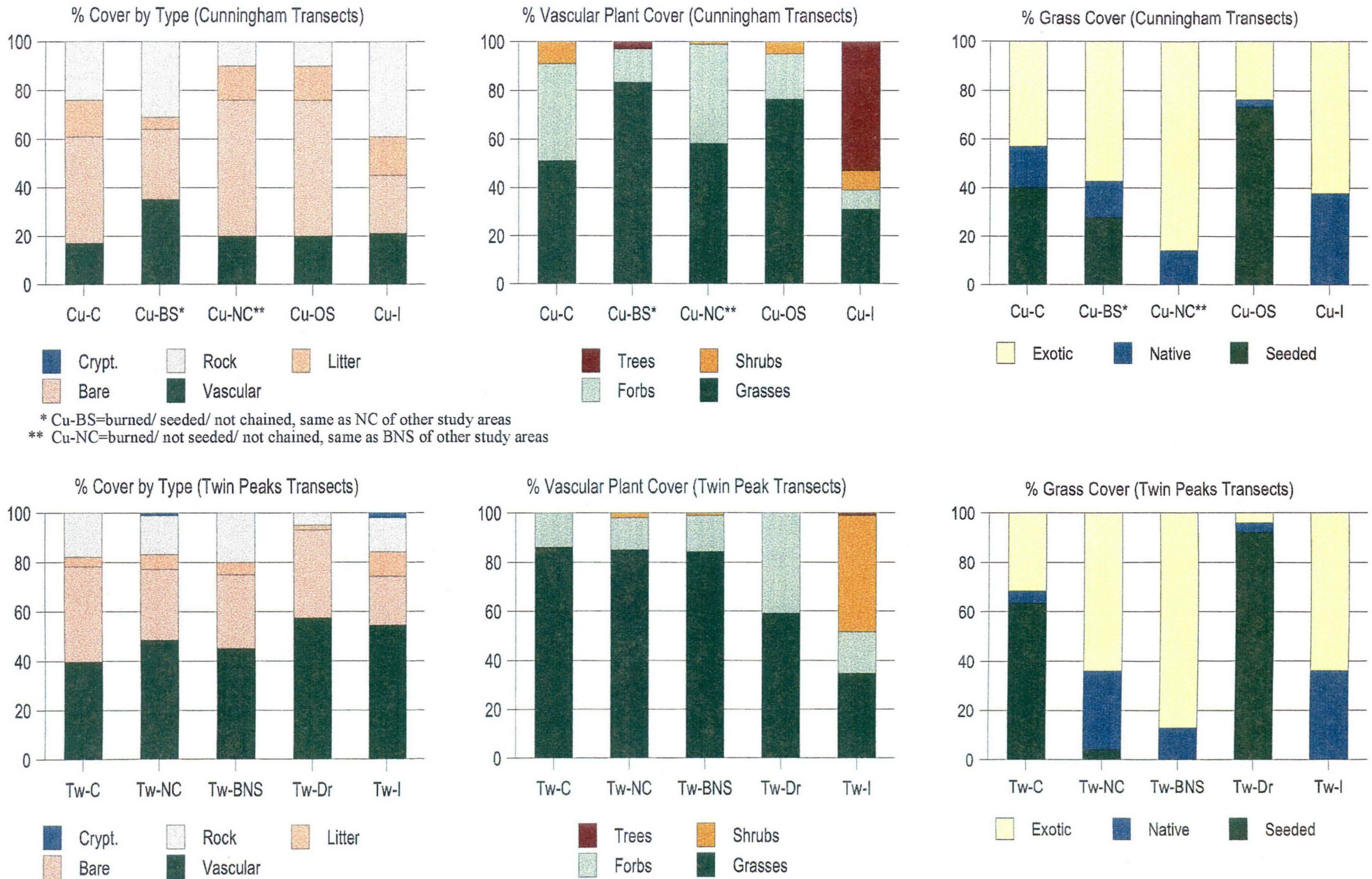
Meter-square, view from East ▲ (8-26-97)



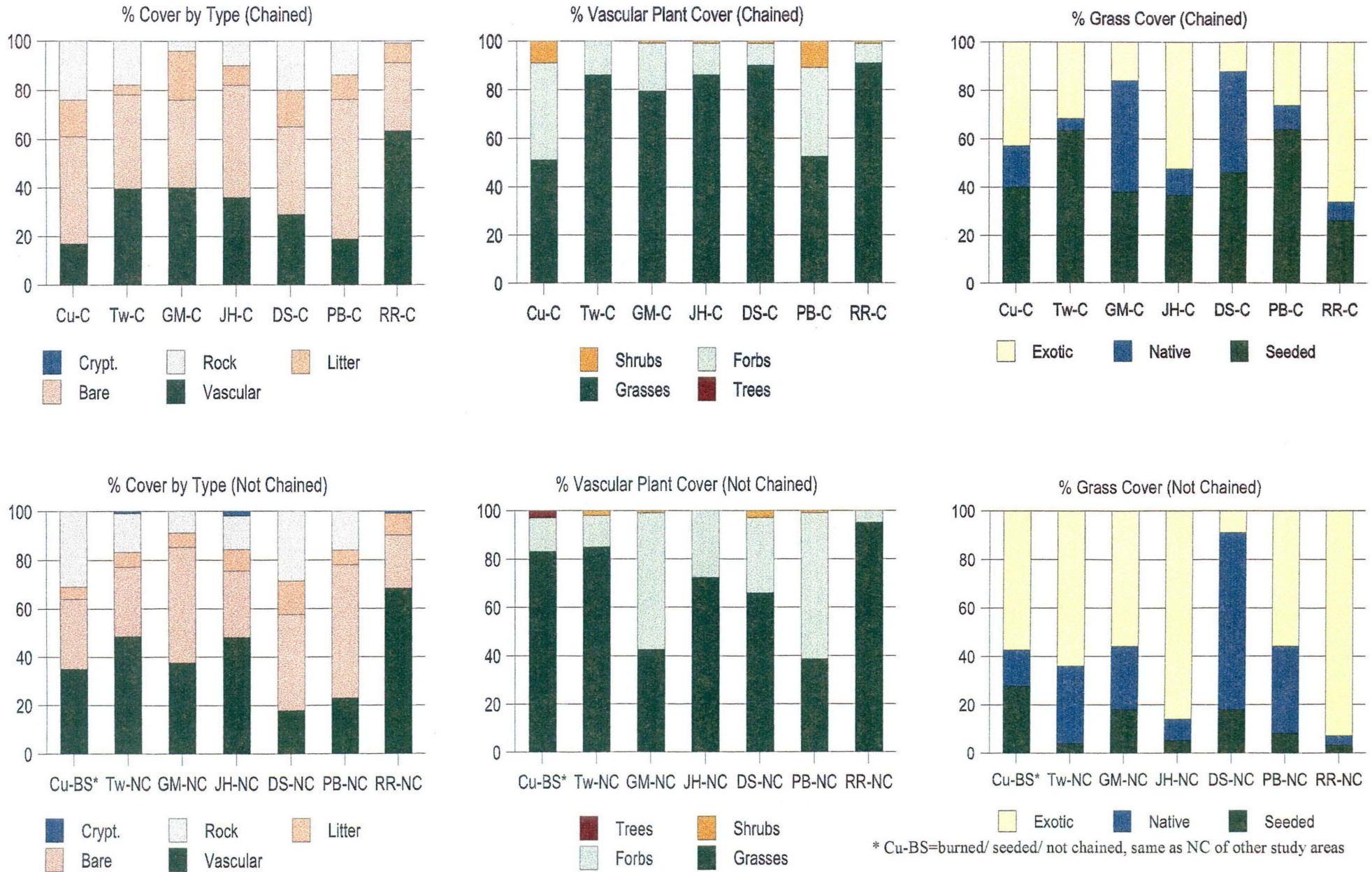
**Figure 12. Mean Cover Data; Comparison of Treatments for Gilson Mtns. and Jericho Hwy. Study Areas**

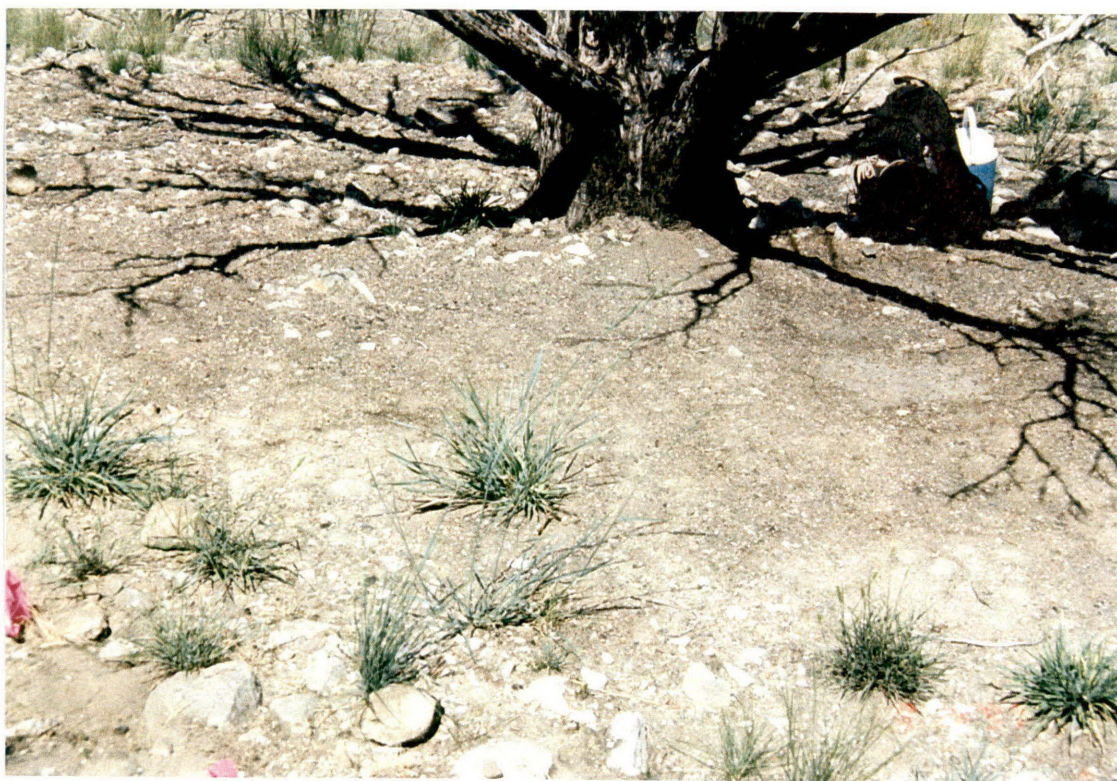


**Figure 13. Mean Cover Data; Comparison of Treatments for Cunningham and Twin Peaks Study Areas**



**Figure 14. Mean Cover Data for Chained and Unchained Transects Across All Sites**

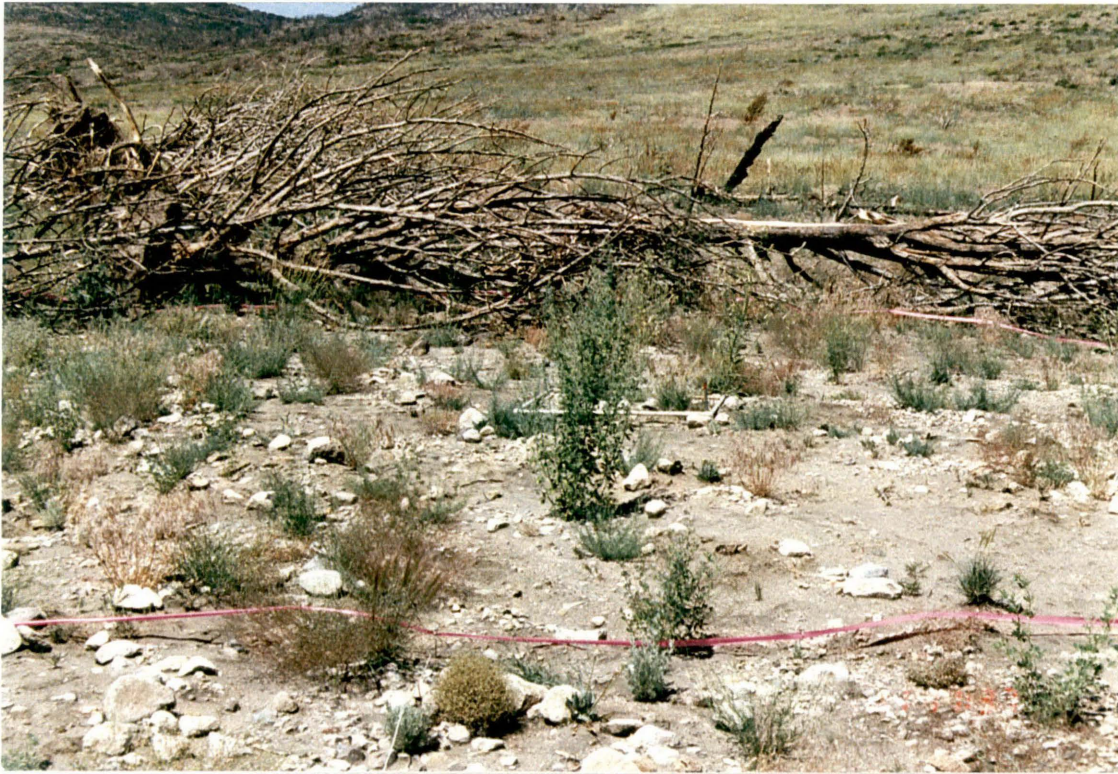




**Figure 15.** Photo taken near DS-NC-P2, illustrating seeded grasses growing in otherwise bare soil beneath burned trees in unchained areas.



**Figure 16.** Photo of Cu-BS-P4, showing high cover of seeded species on these rocky slopes due to aerially seeding alone.



**Figure 17.** Photo of Cu-C-P1, showing prevalence of prostrate kochia (*Kochia prostrata*) on open ground treated with a smooth chain.



**Figure 18.** Photo of Cu-C-P5 meter<sup>2</sup>, with seeded grasses growing beneath a felled, burned tree. Here, the microclimate provided by the tree appears to have been more important for germination than the mechanical impact of the chaining.



**Figure 19.** Photo of PB-C-P4, showing vigorous establishment and growth of fourwing saltbush (*Atriplex canescens*) in deeply-churned chained soil.



**Figure 20.** Photo of GM-C-P2. Foreground shows a patch within the chained area with low establishment of seeded grasses (most grasses visible here are natives).



**Figure 21.** Photos of drilled areas, which generally had thicker cover of seeded species than adjacent chained areas. Above: Tw-Dr-P2; compare with Fig. 21. Below: JH-Dr-P2; compare with Fig. 10.



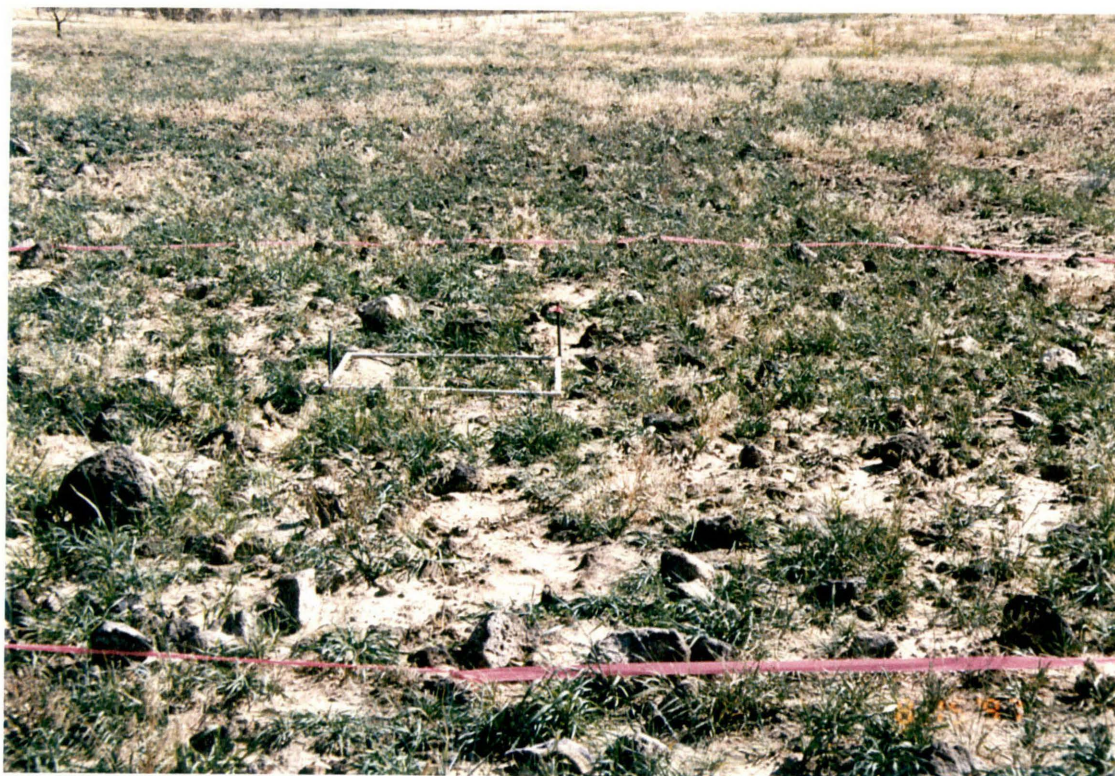


**Figure 22.** Photos showing sites with heavy cover of native perennial grasses.  
Above: GM-C-P1. Below: Dog Valley Slopes study area.





**Figure 23.** Photo of Railroad study area, showing border between chained (right) and unchained (left) treatments. Thick cover by cheatgrass where not chained; greater establishment of seeded grasses on chaining.



**Figure 24.** Photo of Tw-C(B)-P1, showing soil with volcanic rock fragments at surface which were overturned and scattered by chaining.

**TABLE 1. DESCRIPTION AND SPECIES LIST, CUNNINGHAM STUDY AREA**

**Access:** South on either side of I-15 from Sulphurdale exit

**East Transects: Marker Used as Base:** Public lands cadastral section marker, T27S R7W S34 S35 S2 T27S

**Heading and Distance from Marker to Plot Center** (P1 = plot 1, etc.)

Transect C (Burned/Seeded/Chained):

110m(P1), 170m(P2), 230m(P3), 290m(P4) at 195°

Transect NC (Burned/ **Not** Seeded/Not Chained):

200ft(P1) at 165°, then 60m(P2), 120m(P3), 240m(P4), 310m(P5) at 165°

Transect OS (Burned/Old Seeding: Reseeded/Chained)

60m(P1), 120m(P2), 180m(P3), 240m(P4) at 50°

**West Transects: Marker Used as Base:** Rebar at SE corner of unburned junipers near north side of canyon mouth; canyon located directly north of Woodtick Hill

**Heading and Distance from Marker to Plot Center** (P1 = plot 1, etc.)

Transect BS (Burned Slopes, Seeded/Not Chained)

100m(P1), 160m(P2), 220m(P3), 280m(P4) at 180°

Transect I (Intact, Unburned/Untreated)

142m(P1) at 0°, then 60m(P2), 120m(P3), 180m(P4) also at 0°

**Comments:** The west and east transects are separated by about a mile. The west transects lie on the steep (20-35% slope) lower eastern slopes of Woodtick Hill and another unidentified peak. The east transects lie on lower alluvial fan topography of 2-10% slope. Note that the transect labeled NC (not chained) was not seeded and therefore is not analogous to the label NC at other study sites (the proper label, relative to other sites, would be BNS--burned, not seeded). Also, an initial transect length of 200 feet was used on the NC transect before the standard of 60 meters was decided upon. All transects contain four plots except C and NC, which have five. The fifth transects were added for balance because both C-P4 and NC-P4 were located anomalously in wash bottoms.

# **SPECIES LIST**

## Trees

Juniperus osteosperma\*  
Pinus monophylla\*  
Quercus gambelii

## Shrubs

Artemisia tridentata  
Atriplex canescens  
Ceratoides lanata (?)  
Cercocarpus montanus\*  
Chrysothamnus nauseosus  
Eriogonum corymbosum\*  
Gutierrezia sarothrae  
Kochia prostrata  
Opuntia polyacantha  
Purshia tridentata

## Graminoids

Agropyron cristatum  
Agropyron elongatum  
Agropyron intermedium  
Agropyron spicatum  
Bromus inermis  
Bromus japonicus  
Bromus tectorum  
Elymus junceus  
Festuca octoflora  
Hordeum jubatum\*  
Koeleria macrantha  
Oryzopsis hymenoides  
Poa fendleriana  
Setaria viridis  
Sitanion hystrix

## Forbs

Achillea millefolium  
Agoseris glauca  
Alyssum desertorum  
Amaranthus  
Arabis holboellii  
Argemone munita  
Astragalus convallarius  
Astragalus piutensis  
Astragalus utahensis\*  
Calochortus nuttallii  
Chaenactis douglasii  
Chenopodium album  
Chorisporea tenella  
Cirsium wheeleri  
Cryptantha cineria  
Cryptantha nevadensis  
Collinsia parviflora  
Collomia grandiflora  
Crepis occidentalis  
Cymopterus  
Descurainia pinnata  
Draba  
Epilobium brachycarpum  
Erigeron eatonii (?)  
Eriogonum ramosissimum  
Galium aparine  
Gayophytum lasiospermum  
Gilia gilioides  
Gilia inconspicua  
Helianthus annuus  
Lactuca serriola  
Lappula occidentalis  
Leptodactylon pungens\*  
Lotus utahensis  
Lupinus sericeus  
Machaeranthera canescens  
Medicago sativa  
Mentzelia albicaulis\*

Melilotus officinalis  
Microsteris gracilis  
Mimulus rubellus  
Nicotiana attenuata  
Petradoria pumila  
Phlox austromontana\*  
Phlox longifolia  
Physaria chambersii  
Polygonum aviculare  
Polygonum douglasii  
Ranunculus testiculatus  
Salsola iberica  
Sanguisorba minor  
Senecio multilobatus  
Solanum triflorum  
Sphaeralcea grossulariifolia  
Taraxacum officinale  
Tragopogon dubius  
Verbena bracteata  
Viguiera multiflora (?)  
Zigadenus paniculatus

\*Occurring in hillside (west transects) only

**TABLE 2. DESCRIPTION AND SPECIES LIST, TWIN PEAKS STUDY AREA**

**Access:** West from I-15 Exit 135

**Marker Used as Base:** Public lands cadastral 1/4 section marker, T25S R7W S29,32

**Heading and Distance from Marker to Plot Center** (P1 = plot 1, etc.)

Transect C (Burned/Seeded/Chained):

100m(B-P1), 150m(B-P2) at 5°

100m at 280° (H-P1), then 50m at 90° (H-P2)

Transect NC (Burned/Seeded/Not Chained):

100m(P1), 150m(P2), 200m(P3), 250m(P4) at 310°

Transect BNS (Burned/Not Seeded/Not Chained)

100m(P1), 150m(P2), 200m(P3), 250m(P4) at 190°

Transect Dr (Burned/Drilled)

200m at 5°(P2); from P2, 50m at 60° (P1);

from P2, 50m(P3), 100m(P4) at 250°

Transect I (Intact: Unburned and Untreated)

200m(P1), 300m(P2), 350m(P3) at 270°,

then 50m at 45° (P4)

**Comments:** Irregularities in the chained and intact transects were necessary because of the limited extent of these treatments. Two transects of two plots each were made in the chained area: *Chained-Below Hillside(B)* lies on a depositional surface, whereas *Chained-Hillside(H)* lies on a gentle slope of 1-6%. NC and I also lie primarily on this slope, while BNS lies nearer the depositional surface. The burned/not seeded transect lies within a privately-owned section; the other transects lie in the aerially-seeded BLM section.

## SPECIES LIST

### Trees

*Juniperus osteosperma*

### Shrubs

*Artemisia tridentata*  
*Chrysothamnus viscidiflorus*  
*Ephedra nevadensis*  
*Gutierrezia sarothrae*  
*Kochia prostrata*  
*Opuntia polyacantha*  
*Pediocactus simpsonii*

### Graminoids

*Agropyron cristatum*  
*Agropyron elongatum*  
*Agropyron intermedium*  
*Agropyron smithii*  
*Agropyron spicatum*  
*Bromus inermis*  
*Bromus tectorum*  
*Elymus junceus*  
*Oryzopsis hymenoides*  
*Poa secunda*  
*Setaria glauca*  
*Setaria viridis*  
*Sitanion hystrix*  
*Triticum aestivum*

### Forbs

*Agoseris glauca*  
*Allium acuminatum*  
*Alyssum desertorum*  
*Arabis drummondii*  
*Arabis holboellii*  
*Astragalus calycosus*  
*Astragalus piutensis*  
*Astragalus utahensis*  
*Calochortus nuttallii*  
*Chaenactis douglasii*  
*Chorispora tenella* (?)  
*Cryptantha*  
*Comandra umbellata*  
*Crepis occidentalis*  
*Cymopterus*  
*Descurainia pinnata*  
*Draba*  
*Epilobium brachycarpum*  
*Erigeron aphanactis*  
*Eriogonum*  
*Gayophytum lasiospermum*  
*Gilia giliodes*  
*Gilia inconspicua*  
*Lactuca serriola*  
*Leucelene ericoides*  
*Linum perenne*  
*Machaeranthera canescens*  
*Malcolmia africana*  
*Medicago sativa*  
*Mentzelia albicaulis*  
*Melilotus officinalis*  
*Nicotiana attenuata*  
*Petradoria pumila* (?)  
*Phlox austromontana* (?)  
*Phlox longifolia*  
*Physaria chambersii* (?)  
*Ranunculus testiculatus*  
*Salsola paulsenii* (?)  
*Sanguisorba minor*  
*Senecio multilobatus*  
*Sphaeralcea grossulariifolia*  
*Streptanthus cordatus*  
*Tragopogon dubius*  
*Zigadenus paniculatus*

**TABLE 3. DESCRIPTION AND SPECIES LIST, GILSON MOUNTAINS STUDY AREA**

**Access:** 4WD trail along east flank of Gilson Mountains; various access points from Utah State Highway 132

**Marker Used as Base:** Public lands cadastral section marker: T13S R3W S35; T14S R3W S1,S2

**Heading and Distance from Marker to Plot Center** (P1 = plot 1, etc.)

Transect C (Seeded/Chained):

50m(P1), 100m(P2), 150m(P3) at 0°

From C-P1, 50m(P0) at 270°

Transect NC (Seeded/Not Chained):

50m(P2), 100m(P1) at 270°

50m(P3), 100m(P4) at 90°

Transect OS (Old Seeding, Reseeded/Chained)

250m(P1), 300m(P2), 350m(P3), 400m(P4) at 45°

Transect BNS (Burned, Not seeded/Not Chained)

From I-P2L, 250m(P2) at 270°

From BNS-P2, 50m(P3), 100m(P2) 350°

From BNS-P2, 50m(P1) at 170°

Transect I (Intact, Unburned/Untreated)

Lower plots: 350m(P1L), 400m(P2L) at 180°

Upper plots: From BNS-P2, 50m(P3U), 100m(P4U) at 315°

**Comments:** Section 32, southeast of the section corner used as a base, is a state-owned section and was not included in BLM rehabilitation efforts. Nevertheless, the aerial seeding affected the border zones of this state section, as evidenced by the seeded species growing there. A seeded but not chained transect was set up near the section corner, to be compared against an unseeded transect deeper within the state section. Two of the plots of the unburned treatment were placed near unseeded transect within the state section; the other two lie near the section corner boundary. The placement of transects reflects efforts to limit topographic variation while maintaining a systematic setup. Our focus at this study area is the relatively level (4 to 15% slope) topography of wash-bottoms and alluvium between the steeper slopes and ridges. A transect was also placed to sample regrowth in an old seeding of crested wheatgrass, on alluvial fan soils of the valley floor.

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### SPECIES LIST

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#### Trees

*Juniperus osteosperma*

#### Shrubs

*Artemisia tridentata*  
*Atriplex canescens*  
*Chrysothamnus Greenei*  
*Gutierrezia sarothrae*  
*Opuntia polyacantha*  
*Purshia tridentata*

#### Graminoids

*Agropyron cristatum*  
*Agropyron elongatum*  
*Agropyron smithii*  
*Agropyron spicatum*  
*Bromus inermis*  
*Bromus japonicus*  
*Bromus tectorum*  
*Hordeum marinum*  
*Oryzopsis hymenoides*  
*Poa fendleriana*  
*Sitanion hystrix*

#### Forbs

*Alyssum desertorum*  
*Arabis holboellii*  
*Argemone munita*  
*Astragalus*  
*Astragalus (inflated pods)*  
*Astragalus calycosus*  
*Astragalus convallarius*  
*Astragalus eurekaensis*  
*Calochortus nuttallii*  
*Camelina microcarpa*  
*Castilleja*  
*Chaenactis douglasii*  
*Chenopodium album*  
*Chenopodium leptophyllum*  
*Chorispora tenella*  
*Crepis occidentalis*  
*Cryptantha cineria*  
*Cryptantha nevadensis*  
*Descurainia pinnata*  
*Draba verna*  
*Erigeron*  
*Eriogonum deflexum*  
*Eriogonum palmerianum*  
*Gayophytum lasiospermum*  
*Gilia inconspicua*  
*Helianthus annuus*  
*Lactuca serriola*  
*Lappula occidentalis*  
*Leptodactylon pungens*  
*Linum perenne*  
*Machaeranthera canescens*

*Malcolmia africana*  
*Mentzelia albicaulis*  
*Microsteris gracilis*  
*Nicotiana attenuata*  
*Phacelia ivesiana*  
*Phlox austromontana*  
*Phlox longifolia*  
*Ranunculus testiculatus*  
*Salsola iberica*  
*Sisymbrium altissimum*  
*Solanum triflorum*  
*Sphaeralcea grossulariifolia*  
*Streptanthus cordatus*  
*Tragopogon dubius*  
*Vicia americana*  
*Viola*  
*Zigadenus paniculatus*

**TABLE 4. DESCRIPTION AND SPECIES LIST, JERICHO HIGHWAY STUDY AREA**

**Access:** U.S. Highway 6 between Eureka and Jericho

**Marker Used as Base:** Mile marker 124, on east side of highway. Signpost used as reference point for transects east of highway. For transects west of highway, reference point is rebar near highway, placed opposite the signpost.

**Heading and Distance from Marker to Plot Center** (P1= plot 1, etc.)

Transect C (Seeded/Chained):

100 m at 290° (P1), then 60m(P2), 120m(P3), and 180m(P4) at 20°  
From C-P1, 50m(P0) at 270°

Transect NC (Seeded/Not Chained):

West plots: From I-P2, 60m(P1W), 120m(P2W) at 200°.

East plots: 100m at 110 degrees(P1E), then 60m at 35° (P2E)

Transect Dr (Burned/Drilled)

60m at 110°, then 60m(P1), 120m(P2), 180m(P3), 240m(P4) at 20°

Transect BNS (Burned, Not seeded/Not Chained)

20m at 290° (P1), then 50m(P2), 120m(P3), 130m(P4) at 20°.

Also, 200m(P5), 260m(P6) at 19°

Transect I (Intact, Unburned/Untreated)

From C-P1, 120m(P1), 180m(P2), 240m(P3), 300m(P4) at 215°

**Comments:** The standard direction of transects here was 20°/200°, approximately parallel to the highway. The burned/not seeded transect was positioned close to the highway, in a narrow band reportedly outside the path of aerial seeding. However, stray seeded plants were found growing on plots 1-3 of this transect. BNS-P2 was placed at 50 meters instead of 60 meters to avoid an anthill. BNS-P4 landed in an anomalous patch of storksbill (*Erodium cicutarium*) but was retained for monitoring purposes. Two extra plots, BNS-P5 and P6, were added for the consistency of treatment comparisons. They were placed, as were the two east NC plots, on ridgetops. Topographically, this study area includes ridgetops and slopes of the Jericho soil series (gravelly fine sandy loam), and broad basins of the Medburn soil series (fine sandy loam). Drilling took place primarily on the Medburn soil, and BNS plots 1-3 also appear to be on a continuation of this soil on the side of the highway opposite the drilling.

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### SPECIES LIST

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#### Trees

*Juniperus osteosperma*

#### Shrubs

*Artemisia tridentata*  
*Atriplex canescens*  
*Chrysothamnus nauseosus*  
*Chrysothamnus viscidiflorus*  
*Cowania mexicana*  
*Ephedra nevadensis*  
*Gutierrezia sarothrae*  
*Opuntia polyacantha*  
*Tetradymia canescens*

#### Graminoids

*Agropyron cristatum*  
*Agropyron elongatum*  
*Agropyron intermedium?*  
*Agropyron smithii*  
*Bromus inermis*  
*Bromus japonicus*  
*Bromus tectorum*  
*Elymus cinereus*  
*Elymus junceus?*  
*Festuca octoflora*  
*Oryzopsis hymenoides*  
*Sitanion hystrix*  
*Stipa comata*

#### Forbs

*Alyssum desertorum*  
*Amaranthus blitoides*  
*Arabis holboellii*  
*Argemone munita*  
*Astragalus* (inflated pods)  
*Astragalus calycosus*  
*Astragalus eurekaensis*  
*Camissonia boothii*  
*Castilleja*  
*Chaenactis douglasii*  
*Chenopodium album*  
*Cirsium* (musk thistle)  
*Descurainia pinnata*  
*Eriogonum deflexum*  
*Eriogonum maculatum*  
*Erodium cicutarium*  
*Euphorbia micromera*  
*Gayophytum decipiens*  
*Gayophytum lasiospermum*  
*Gilia inconspicua*  
*Gilia polycladon*  
*Helianthus annuus*  
*Lactuca serriola*  
*Lappula occidentalis*  
*Lygodesmia grandiflora*  
*Machaeranthera canescens*  
*Malcolmia africana*  
*Medicago sativa*  
*Mentzelia albicaulis*  
*Melilotus officinalis*  
*Monolepis nuttalliana*  
*Nicotiana attenuata*  
*Oenothera caespitosa*

*Orobanche multiflora*  
*Phacelia ivesiana*  
*Phlox longifolia*  
*Polygonum ramosissimum*  
*Ranunculus testiculatus*  
*Salsola iberica*  
*Sanguisorba minor*  
*Senecio multilobatus*  
*Sisymbrium altissimum*  
*Sphaeralcea grossulariifolia*  
*Stanleya pinnata*  
*Stephanomeria exigua*  
*Streptanthus cordatus*  
*Tragopogon dubius*  
*Verbena bracteata*

TABLE 5. DESCRIPTION AND SPECIES LIST, DOG VALLEY SLOPES STUDY AREA

**Access:** Highway connecting Utah State Highway 132 and US Highway 6 at Jericho Junction, to turnoff at Furner Creek leading to Tidwell Spring

**Marker Used as Base:** Rebar placed 110 meters at 195 degrees from southwest corner of enclosure surrounding Tidwell Spring.

**Heading and Distance from Marker to Plot Center** (P1= plot 1, etc.)

Transect C (Seeded/Chained):

50m at 300°, then 25m at 210°(P1)

100m at 300°, then 25m at 210°(P2)

150m at 300°, then 25m at 210°(P3)

From 150m at 300°, 50m at 255°, then 25m at 165°(P4)

Transect NC (Seeded/Not Chained):

50m at 300°, then 25m at 30°(P1)

100m at 300°, then 25m at 30°(P2)

150m at 300°, then 25m at 30°(P3)

From 150m at 300°, 50m at 255°, then 25m at 345°(P4)

**Comments:** Topography here is a steep hillside (20-34% slope) facing north-northwest (aspect between 390° and 110°). The upper part of this hillside was chained; the lower part was not. A reference transect was oriented along the lower boundary of the chaining, with a bend of 45° at 150 meters. Plots, both chained and unchained, were placed 25 meters from this reference line, at 50-meter intervals. Presumably, all of this study area was aeri ally seeded, although NC-P4 lacked seeded species and may lie outside the seeded zone.

## SPECIES LIST

### Trees

-none-

### Shrubs

Artemisia tridentata  
Chrysothamnus nauseosus  
Chrysothamnus viscidiflorus  
Eriogonum corymbosum  
Gutierrezia microcephala (?)  
Gutierrezia sarothrae  
Kochia prostrata

### Graminoids

Agropyron cristatum  
Agropyron elongatum  
Agropyron intermedium  
Agropyron spicatum  
Bromus japonicus  
Bromus tectorum  
Oryzopsis hymenoides  
Poa fendleriana  
Sitanion hystrix  
Stipa comata

### Forbs

Agoseris glauca  
Alyssum desertorum  
Amaranthus blitoides  
Arabis holboellii  
Arenaria fendleri  
Astragalus calycosus  
Astragalus eurekaensis  
Calochortus nuttallii  
Castilleja (?)  
Caulanthus crassicaulis  
Chaenactis douglasii  
Chenopodium album  
Cordylanthus kingii (?)  
Crepis acuminata  
Cryptantha cineria  
Cryptantha nevadensis  
Descurainia pinnata  
Erigeron  
Eriogonum deflexum  
Gilia inconspicua  
Helianthus annuus  
Hymenopappus filifolius  
Hypochaeris (?)  
Lactuca serriola  
Leptodactylon pungens  
Lithospermum incisum  
Machaeranthera canescens  
Malacothrix glabrata (?)  
Nicotiana attenuata  
Petradoria pumila  
Phacelia ivesiana  
Phlox austromontana  
Physaria chambersii  
Salsola iberica  
Sisymbrium altissimum  
Solanum triflorum  
Streptanthus cordatus  
Tragopogon dubius  
unknown (Cryptantha-like)  
unknown (Verbena-like: Marrubium?)

**TABLE 6. DESCRIPTION AND SPECIES LIST, PAUL BUNYAN'S WOODPILE**

**Access:** US Highway 6 between Eureka and Jericho Junction; along turnoff road leading to Paul Bunyan's Woodpile

**Marker Used as Base:** Rebar placed near outermost end of an isolated chained strip, midway between the two sides of the strip.

**Heading and Distance from Marker to Plot Center** (P1= plot 1, etc.)

Transect C (Seeded/Chained):

60m(P1), 120m(P2), 180m(P3), 240m(P4) at 280°

Transect NC (Seeded/Not Chained):

From C-P1, 60m at 190°(P1),

then 60m(P2), 120m(P3), 180m(P4) at 280°

**Comments:** The chained and unchained transects are parallel and separated by 60 meters. Topography is gently sloping (5-11% slope), alluvial soil, on western foothills of East Tintic Mountains.

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**SPECIES LIST**
Trees

-none-

Shrubs

Atriplex canescens  
Cowania mexicana  
Ephedra nevadensis  
Ephedra viridis  
Purshia tridentata

Graminoids

Agropyron cristatum  
Agropyron elongatum  
Agropyron intermedium(?)  
Agropyron spicatum  
Bromus inermis  
Bromus japonicus  
Bromus tectorum  
Oryzopsis hymenoides  
Sitanion hystrix

Forbs

Agoseris glauca  
Alyssum desertorum  
Argemone munita  
Astragalus (blue/purple leaves)  
Astragalus (inflated pods)  
Astragalus calycosus  
Astragalus eurekaensis  
Calochortus nuttallii  
Camilsonia boothii  
Chaenactis douglasii  
Chenopodium album  
Crepis acuminata  
Descurainia pinnata  
Eriogonum deflexum  
Eriogonum maculatum  
Gilia inconspicua  
Gilia polycladon  
Lactuca serriola  
Machaeranthera canescens  
Melilotus officinalis  
Nicotiana attenuata  
Phacelia ivesiana  
Phlox austromontana  
Phlox longifolia  
Physaria chambersii  
Senecio multilobatus  
Streptanthus cordatus  
Zigadenus paniculatus

**TABLE 7. DESCRIPTION AND SPECIES LIST, RAILROAD STUDY AREA**

**Access:** US Highway 6 between Eureka and Jericho Junction, about one mile north of road to Paul Bunyan's Woodpile; 4WD trail headed west

**Marker Used as Base:** Rebar placed 151m at 195° from Public lands cadastral section marker, T12S R3W S15 S16 S21 S22.

**Heading and Distance from Marker to Plot Center** (P1= plot 1, etc.)

Transect C (Seeded/Chained):

50m at 225°, then 12.5m at 315°(P1)  
100m at 225°, then 12.5m at 315°(P2)  
150m at 225°, then 12.5m at 315°(P3)  
250m at 225°, then 12.5m at 315°(P4)

Transect NC (Seeded/Not Chained):

50m at 225°, then 12.5m at 135°(P1)  
100m at 225°, then 12.5m at 135°(P2)  
200m at 225°, then 12.5m at 135°(P3)  
250m at 225°, then 12.5m at 135°(P4)

**Comments:** Topography here is similar to the nearby Jericho Highway site, but transects here lie on the Wales loam, a deep and relatively level soil (5-7% slope). A reference transect was aligned along the boundary of the narrow chained strip, running NW/SW. Plots were placed 12.5 meters from this reference line, at 50-meter intervals. Thus, each chained plot is paired with an unchained plot 25 meters away, except for C-P3 and NC-P3, which were positioned in a staggered fashion on the two sides of a gully.

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### SPECIES LIST

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#### Trees

-none-

#### Shrubs

Artemisia tridentata  
Atriplex canescens  
Opuntia polyacantha

#### Graminoids

Agropyron cristatum  
Agropyron elongatum  
Agropyron smithii  
Bromus inermis  
Bromus japonicus  
Bromus tectorum  
Elymus cinereus?  
Festuca octoflora  
Oryzopsis hymenoides  
Poa fendleriana  
Sitanion hystrix

#### Forbs

Alyssum desertorum  
Amaranthus blitoides  
Arabis holboellii  
Argemone munita  
Astragalus (inflated pods)  
Astragalus nuttallianus  
Calochortus nuttallii  
Camissonia boothii  
Chaenactis douglasii  
Descurainia pinnata  
Erigeron  
Eriogonum deflexum  
Gilia inconspicua  
Helianthus annuus  
Lactuca serriola  
Lappula occidentalis  
Mentzelia albicaulis  
Nicotiana attenuata  
Oenothera caespitosa  
Phlox longifolia  
Sisymbrium altissimum  
Sphaeralcea grossulariifolia  
Stanleya pinnata  
Streptanthus cordatus  
Tragopogon dubius

Table 8. Example of completed datasheet for a representative plot, JH-C-P4

Place Name Jericho Highway-Chained-Plot 4  
 Treatment Classification Burned/Seeded/Chained  
 Plot Label JH-C-P4 Date 26 AUG 1997 Recorders J.E.Ott, S.C. Sanderson  
 Photo Directions and Headings From North and from West, taken 29 AUG 1997  
 Location: Latitude (to be determined) Longitude   
 Marker Used as Base Milemarker 124, U.S. Highway 6  
 Heading and Distance from Marker to Plot Center From rebar on west side of road opposite milemarker sign: 100 meters at 160 degrees (JH-C-P1), then 180 meters at 20 degrees.  
 Plot Size 1/40 ACRE Slope 8% Aspect 110% Elevation 5250'  
 Parent Material Alluvium from igneous rocks  
 Soil Series Jericho Soil Texture gravelly fine sandy loam  
 Soil Erosion/Rilling Pooling, slight soil flow but no rills  
 Vegetational Type prior to fire Juniper with sagebrush understory  
 Seral Stage Pioneer, post-fire  
 Pinyon/Juniper Invasion none Weed Establishment Musk thistle present  
 T&E Plant Species none Grazing Activity minimal  
 Notes and Comments Plot situated on a low, flat ridgetop. Good seedling establishment though bare soil also; cheatgrass not prevalent.

### RECONNAISSANCE DATA

cover/sociability  
 (Seeded species in bold)

<u>Trees</u>		<u>Forbs</u>	
-none-		Astragalus (inflated pods)	+ 1
		Astragalus eurekaensis	+ 1
<u>Shrubs</u>		Cirsium (musk thistle)	+ 1
<b>Atriplex canescens</b>	+ 1	Descurainia pinnata	+ 1
		Gilia inconspicua	1 1
<u>Graminoids</u>		Helianthus annuus	+ 1
<b>Agropyron cristatum</b>	1 1to2	Lappula occidentalis	+ 1
<b>Agropyron elongatum</b>	2 1	Malcolmia africana	+ 1
<b>Bromus inermis</b>	1 1to2	Phacelia ivesiana	+ 1
Bromus japonicus	+ 1	Sisymbrium altissimum	+ 1
Bromus tectorum	1 1	Sphaeralcea grossulariifolia	+ 1
<b>Elymus cinereus(?)</b>	+ 1		
Oryzopsis hymenoides	+ 1		
Sitanion hystrix	+ 1		

### COVER BY TYPE

Vascular Plants 45 % Bare soil 40 % Litter 7 %  
 Rock >1cm 8 % Cryptogams + % Standing Dead 5 %

### RELATIVE COMPOSITION OF VASCULAR PLANT COVER

Trees 0 % Shrubs 1 % Grasses 85 % Forbs 14 %

### RELATIVE COMPOSITION OF GRASS COVER

Exotic 20 % Native 10 % Seeded 70 %

<u>Cover classes</u>		<u>Sociability classes</u>	
< 1%	+	Growing as single, widely spaced individuals	- 1
1 - 5%	1	Small groups	- 2
6 - 25%	2	In small patches	- 3
26 - 50%	3	Extensive patches	- 4
51 - 75%	4	In nearly pure stands	- 5

**Table 8 cont. Continuation of completed datasheet for a representative plot, JH-C-P4**

Place Name Jericho Highway-Chained-Plot 4  
 Treatment Classification Burned/Seeded/Chained  
 Plot Label JH-C-P4 Date 26 AUG 1997 Recorders J.E.Ott, S.C. Sanderson

**Meter-square subsample, NE of plot center**  
**Photo taken from east, 26 AUG 1997**

**VASCULAR PLANT COVER**

(Seeded species in bold)

SPECIES NAME	# OF INDIVIDUALS	% OF TOTAL COVER
<b>Agropyron cristatum</b>	9	10
<b>Agropyron elongatum</b>	4	8
<b>Bromus inermis</b>	11	5
Bromus tectorum	4	6
Gilia inconspicua	4	8
Helianthus annuus	0	5

**COVER BY TYPE**

Vascular Plants 35 % Bare soil 50 % Litter 5 %  
 Rock >1cm 10 % Cryptogams + % Standing Dead 0 %

**Table 9. Cover data for individual plots and transect means, Cu-C**

	<b>Cunningham--Burned/ Seeded/ Chained</b>					
	C-P1	C-P2	C-P3	C-P4	C-P5	Mean
<b>Understory Cover by Type (Total=100%)</b>						
Vascular Plants	20	15	15	15	20	<b>17</b>
Bare Soil	50	45	40	45	40	<b>44</b>
Litter	5	10	15	30	15	<b>15</b>
Rock>1 cm	25	30	30	10	25	<b>24</b>
Cryptogams	0	0	0	0	0.5	<b>0</b>
<b>Overstory Cover (%)</b>						
Dead/Live Trees	8	10	20	30	20	<b>18</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>						
Trees	0	0	1	0	0.5	<b>0</b>
Shrubs	25	5	9	0.5	5	<b>9</b>
Grasses	30	60	70	35	60	<b>51</b>
Forbs	45	35	20	65	35	<b>40</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>						
Exotic	60	40	45	65	5	<b>43</b>
Native	20	15	0	0	50	<b>17</b>
Seeded	20	45	55	35	45	<b>40</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>						
Vascular Plants	20	15	2	10	20	<b>13</b>
Bare Soil	40	60	63	65	40	<b>54</b>
Litter	5	5	5	5	40	<b>12</b>
Rock>1 cm	35	20	30	20	10	<b>23</b>
Cryptogams	0	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>						
Dead/Live Trees	0	0	1	2	90	<b>19</b>

**Table 9 cont. Cover data for individual plots and transect means, Cu-NC and Cu-OS**

37

	Cunningham Burned/ Not Seeded/ Not Chained						Cunningham Old Seeding: Burned/ Reseeded					
	NC-P1	NC-P2	NC-P3	NC-P4	NC-P5	Mean	OS-P1	OS-P2	OS-P3	OS-P4	Mean	
<b>Understory Cover by Type (Total=100%)</b>												
Vascular Plants	15	10	35	25	15	<b>20</b>	45	35	65	35	<b>45</b>	
Bare Soil	55	50	40	65	70	<b>56</b>	20	55	20	45	<b>35</b>	
Litter	30	25	5	3	5	<b>14</b>	20	5	10	5	<b>10</b>	
Rock>1 cm	0	15	20	7	10	<b>10</b>	15	5	5	15	<b>10</b>	
Cryptogams	0	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	
<b>Overstory Cover (%)</b>												
Dead/Live Trees	40	20	30	25	35	<b>30</b>	8	0.5	0.5	5	<b>4</b>	
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>												
Trees	0	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	
Shrubs	5	0.5	0	0.5	1	<b>1</b>	2	5	1	10	<b>5</b>	
Grasses	50	50	50	70	70	<b>58</b>	93	80	80	55	<b>77</b>	
Forbs	45	50	50	30	29	<b>41</b>	5	15	19	35	<b>19</b>	
<b>Relative Composition of Grass Cover (Total=100%)</b>												
Exotic	95	99	100	98	35	<b>85</b>	40	15	15	24	<b>24</b>	
Native	4	1	0.5	1	65	<b>14</b>	0.5	5	5	1	<b>3</b>	
Seeded	1	0	0	1	0	<b>0</b>	60	80	80	75	<b>74</b>	
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>												
Vascular Plants	20	10	20	10	1	<b>12</b>	30	25	45	20	<b>30</b>	
Bare Soil	50	60	38	74	95	<b>63</b>	45	67	45	60	<b>54</b>	
Litter	0.5	30	2	1	1	<b>7</b>	5	3	5	5	<b>5</b>	
Rock>1 cm	30	0.5	40	15	3	<b>18</b>	20	5	5	15	<b>11</b>	
Cryptogams	0	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	
<b>Meter-square Subsample: Overstory Cover (%)</b>												
Dead/Live Trees	?	0.5	0	0	100	<b>25</b>	0	0?	0	0	<b>0</b>	

**Table 9 cont. Cover data for individual plots and transect means, Cu-BS and Cu-I**

38

	Cunningham--Burned Slopes:					Cunningham--Intact Slopes:				
	<u>Burned/ Seeded/ Not Chained</u>					<u>Unburned/ Untreated</u>				
	BS-P1	BS-P2	BS-P3	BS-P4	Mean	I-P1	I-P2	I-P3	I-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	20	35	50	35	<b>35</b>	10	35	20	20	<b>21</b>
Bare Soil	55	25	25	12	<b>29</b>	25	25	15	30	<b>24</b>
Litter	5	5	5	3	<b>5</b>	15	15	15	20	<b>16</b>
Rock>1 cm	20	35	20	50	<b>31</b>	50	25	50	30	<b>39</b>
Cryptogams	0	0	0.5	0.5	<b>0</b>	on rock	on rock	on rock	on rock	<b>0</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	35	30	60	35	<b>40</b>	15	20	20	30	<b>21</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	10	0	0	0	<b>3</b>	60	40	50	60	<b>53</b>
Shrubs	0.5	0	0	0	<b>0</b>	5	20	0.5	8	<b>8</b>
Grasses	85	90	85	75	<b>84</b>	20	30	45	30	<b>31</b>
Forbs	5	10	15	25	<b>14</b>	15	10	5	2	<b>8</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	70	70	55	35	<b>58</b>	50	55	85	60	<b>63</b>
Native	0.5	5	35	20	<b>15</b>	50	45	15	40	<b>38</b>
Seeded	30	25	10	45	<b>28</b>	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	30	25	25	10	<b>23</b>	10	10	5	5	<b>8</b>
Bare Soil	40	20	35	10	<b>26</b>	20	40	15	45	<b>30</b>
Litter	5	10	20	5	<b>10</b>	40	5	25	15	<b>21</b>
Rock>1 cm	25	45	20	75	<b>41</b>	30	45	50	35	<b>40</b>
Cryptogams	0	0	0	0	<b>0</b>	1 (rock)	0.5	5	5 (rock)	<b>1</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	10	100	90	<b>50</b>	60	0	5	0	<b>16</b>

**Table 10. Cover data for individual plots and transect means, Tw-C and Tw-NC**

39

	<u>Twin Peaks--Burned/ Seeded/ Chained</u>					<u>Twin Peaks--Burned/ Seeded/ Not Chained</u>				
	C(H)-P1	C(H)-P2	C(B)-P1	C(B)-P2	Mean	NC-P1	NC-P2	NC-P3	NC-P4	NC-avg
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	35	60	35	30	<b>40</b>	35	50	60	50	<b>49</b>
Bare Soil	47	20	40	48	<b>39</b>	40	30	15	30	<b>29</b>
Litter	3	5	5	2	<b>4</b>	5	5	10	5	<b>6</b>
Rock>1 cm	15	15	20	20	<b>18</b>	20	15	15	15	<b>16</b>
Cryptogams	0	0	0	0	<b>0</b>	0.5	0.5	0.5	0.5	<b>1</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	0	1	0	0	<b>0</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	1	0	0	0	<b>0</b>	2	2	0.5	5	<b>2</b>
Grasses	85	95	85	80	<b>86</b>	85	85	90	80	<b>85</b>
Forbs	14	5	15	20	<b>14</b>	13	13	10	15	<b>13</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	42	45	20	20	<b>32</b>	60	42	65	90	<b>64</b>
Native	8	10	0	0.5	<b>5</b>	35	50	34	7	<b>32</b>
Seeded	50	45	80	80	<b>64</b>	5	8	1	3	<b>4</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	20	25	20	35	<b>25</b>	20	30	60	35	<b>36</b>
Bare Soil	60	50	60	50	<b>55</b>	45	45	15	25	<b>33</b>
Litter	5	5	5	2	<b>4</b>	5	5	10	30	<b>13</b>
Rock>1 cm	15	20	15	13	<b>16</b>	30	20	15	10	<b>19</b>
Cryptogams	0	0	0	0	<b>0</b>	0.5	0.5	0.5	0.5	<b>1</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>

**Table 10 cont. Cover data for individual plots and transect means, Tw-BNS and Tw-Dr** 40

	Twin Peaks Burned/ Not Seeded/ Not Chained					Twin Peaks Burned/ Drilled				
	BNS-P1	BNS-P2	BNS-P3	BNS-P4	Mean	Dr-P1	Dr-P2	Dr-P3	Dr-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	40	50	45	45	<b>45</b>	65	50	50	65	<b>58</b>
Bare Soil	35	25	30	30	<b>30</b>	28	47	40	30	<b>36</b>
Litter	5	5	5	5	<b>5</b>	2	2	2	1	<b>2</b>
Rock>1 cm	20	20	20	20	<b>20</b>	5	1	8	4	<b>5</b>
Cryptogams	0.5	0.5	0	0.5	<b>0</b>	0	0	0	0	<b>0</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	0	0	1	3	<b>1</b>	0	0	0	0	<b>0</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	1	0	0.5	1	<b>1</b>	0	0	0	0.5	<b>0</b>
Grasses	85	85	90	80	<b>85</b>	65	55	60	55	<b>59</b>
Forbs	14	15	10	19	<b>15</b>	35	45	40	45	<b>41</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	95	80	85	90	<b>88</b>	1	1	7	8	<b>4</b>
Native	5	20	15	10	<b>13</b>	4	1	1	8	<b>4</b>
Seeded	0	0	0	0	<b>0</b>	95	98	92	84	<b>92</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	30	20	25	15	<b>23</b>	50	40	40	60	<b>48</b>
Bare Soil	30	40	30	35	<b>34</b>	45	59	50	36	<b>48</b>
Litter	10	5	5	5	<b>6</b>	2	0.5	2	2	<b>2</b>
Rock>1 cm	30	35	40	45	<b>38</b>	3	1	8	2	<b>4</b>
Cryptogams	0	0	0	0.5	<b>0</b>	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>

**Table 10 cont. Cover data for individual plots and transect means, Tw-I**

<b>Twin Peaks--Intact: Unburned/ Untreated</b>					
	<b>I-P1</b>	<b>I-P2</b>	<b>I-P3</b>	<b>I-P4</b>	<b>Mean</b>
<b>Understory Cover by Type (Total=100%)</b>					
Vascular Plants	50	55	55	60	<b>55</b>
Bare Soil	30	15	25	10	<b>20</b>
Litter	10	10	10	10	<b>10</b>
Rock>1 cm	10	15	10	20	<b>14</b>
Cryptogams	0.5	5	0.5	0.5	<b>2</b>
<b>Overstory Cover (%)</b>					
Dead/Live Trees	0	0	0	0	<b>0</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>					
Trees	1	1	0.5	0.5	<b>1</b>
Shrubs	55	40	55	40	<b>48</b>
Grasses	35	40	25	40	<b>35</b>
Forbs	9	19	20	20	<b>17</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>					
Exotic	65	70	55	65	<b>64</b>
Native	35	30	45	35	<b>36</b>
Seeded	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>					
Vascular Plants	50	60	80	35	<b>56</b>
Bare Soil	20	15	8	20	<b>16</b>
Litter	10	15	10	25	<b>15</b>
Rock>1 cm	20	5	0.5	19	<b>11</b>
Cryptogams	0	5	2	1	<b>2</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>					
Dead/Live Trees	0	0	dead Artr	litter	<b>0</b>

**Table 11. Cover data for individual plots and transect means, GM-C and GM-NC**

	Gilson Mountains Burned/ Seeded/ Chained					Gilson Mountains Burned/ Seeded/ Not Chained				
	C-P0	C-P1	C-P2	C-P3	Mean	NC-P1	NC-P2	NC-P3	NC-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	35	80	15	30	<b>40</b>	55	35	15	45	<b>38</b>
Bare Soil	35	12	65	30	<b>36</b>	35	35	78	45	<b>48</b>
Litter	20	8	18	35	<b>20</b>	5	5	2	10	<b>6</b>
Rock>1 cm	10	0.5	2	5	<b>4</b>	5	25	5	0.5	<b>9</b>
Cryptogams	0.5	0	0	0	<b>0</b>	0	0.5	0	0	<b>0</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	50	10	10	30	<b>25</b>	25	25	70	1	<b>30</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	0.5	0.5	0.5	0.5	<b>1</b>	0.5	1	1	0.5	<b>1</b>
Grasses	65	99	80	75	<b>80</b>	40	45	35	50	<b>43</b>
Forbs	35	1	20	25	<b>20</b>	60	54	64	50	<b>57</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	10	20	10	25	<b>16</b>	60	70	50	45	<b>56</b>
Native	5	70	85	25	<b>46</b>	35	30	10	30	<b>26</b>
Seeded	85	10	5	50	<b>38</b>	5	0.5	40	25	<b>18</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	35	60	20	50	<b>41</b>	50	35	10	30	<b>31</b>
Bare Soil	35	35	75	25	<b>43</b>	40	20	80	59	<b>50</b>
Litter	20	5	3	23	<b>13</b>	5	5	1	10	<b>5</b>
Rock>1 cm	10	0.5	2	2	<b>4</b>	5	40	9	1	<b>14</b>
Cryptogams	0	0	0	0	<b>0</b>	0	0.5	0	0	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	25	0	0	100	<b>31</b>	0	0	100	0	<b>25</b>

**Table 11 cont. Cover data for individual plots and transect means, GM-BNS and GM-OS** <sup>43</sup>

	Gilson Mountains					Gilson Mtns.				
	Burned/ Not Seeded/ Not Chained					Old Seeding: Burned/ Not Reseeded				
	BNS-P1	BNS-P2	BNS-P3	BNS-P4	Mean	OS-P1	OS-P2	OS-P3	OS-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	60	30	20	80	<b>48</b>	60	60	50	65	<b>59</b>
Bare Soil	25	50	55	10	<b>35</b>	25	25	40	25	<b>29</b>
Litter	5	5	15	5	<b>8</b>	10	10	8	8	<b>9</b>
Rock>1 cm	10	15	10	5	<b>10</b>	5	5	0.5	0.5	<b>3</b>
Cryptogams	0.5	0	0	0.5	<b>0</b>	0.5	0	2	2	<b>1</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	40	50	50	10	<b>38</b>	1	0	0	0.5	<b>0</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	0	0	1	0	<b>0</b>	1	0	0	0	<b>0</b>
Grasses	60	35	19	70	<b>46</b>	85	95	95	95	<b>93</b>
Forbs	40	65	80	30	<b>54</b>	14	5	5	5	<b>7</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	60	100	65	85	<b>78</b>	5	5	5	0.5	<b>4</b>
Native	40	0.5	35	15	<b>23</b>	15	50	5	45	<b>29</b>
Seeded	0	0.5	0	0	<b>0</b>	80	45	90	55	<b>68</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	35	15	25	70	<b>36</b>	40	40	25	50	<b>39</b>
Bare Soil	25	70	60	5	<b>40</b>	35	53	65	45	<b>50</b>
Litter	20	1	5	15	<b>10</b>	23	5	9	5	<b>11</b>
Rock>1 cm	20	14	10	10	<b>14</b>	2	2	0.5	0.5	<b>1</b>
Cryptogams	0.5	0	0	0	<b>0</b>	0	0	1	0.5	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	100	0	5	<b>26</b>	50	0	0	0	<b>13</b>

**Table 11 cont. Cover data for individual plots and transect means, GM-I****Gilson Mountains--Intact: Unburned/ Untreated**

	I-P1 (L)	I-P2 (L)	I-P3 (U)	I-P4 (U)	Mean
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**Understory Cover by Type (Total=100%)**

Vascular Plants	45	55	25	50	<b>44</b>
Bare Soil	15	15	25	20	<b>19</b>
Litter	25	20	20	10	<b>19</b>
Rock>1 cm	5	5	20	10	<b>10</b>
Cryptogams	10	5	10	10	<b>9</b>

**Overstory Cover (%)**

Dead/Live Trees	30	30	50	60	<b>43</b>
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**Relative Composition of Vascular Plant Cover (Total=100%)**

Trees	30	45	1	0	<b>19</b>
Shrubs	20	5	1	0.5	<b>7</b>
Grasses	45	45	85	95	<b>68</b>
Forbs	5	5	13	5	<b>7</b>

**Relative Composition of Grass Cover (Total=100%)**

Exotic	45	85	55	80	<b>66</b>
Native	55	15	45	20	<b>34</b>
Seeded	0	0.5	0	0	<b>0</b>

**Meter-square Subsample: Understory Cover by Type (Total=100%)**

Vascular Plants	15	45	10	5	<b>19</b>
Bare Soil	35	22	55	40	<b>38</b>
Litter	30	20	10	35	<b>24</b>
Rock>1 cm	5	3	20	15	<b>11</b>
Cryptogams	15	10	5	5	<b>9</b>

**Meter-square Subsample: Overstory Cover (%)**

Dead/Live Trees	0	25	0	2	<b>7</b>
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**Table 12. Cover data for individual plots and transect means, JH-C and JH-NC**

	Jericho Highway Burned/ Seeded/ Chained					Jericho Highway Burned/ Not Seeded/ Not Chained				
	C-P1	C-P2	C-P3	C-P4	Mean	NC-P1	NC-P2	NC-P1	NC-P2	Mean
						West	West	East	East	
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	30	35	35	45	<b>36</b>	50	30	65	50	<b>49</b>
Bare Soil	60	55	30	40	<b>46</b>	30	40	15	25	<b>28</b>
Litter	5	5	15	7	<b>8</b>	5	10	10	10	<b>9</b>
Rock>1 cm	5	5	20	8	<b>10</b>	10	20	10	15	<b>14</b>
Cryptogams	0.5	0	0.5	0.5	<b>0</b>	5	0.5	0.5	0.5	<b>2</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	2	0	30	5	<b>9</b>	1	40	15	15	<b>18</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	1	0	2	1	<b>1</b>	0.5	0	0.5	0	<b>0</b>
Grasses	90	85	85	85	<b>86</b>	75	50	95	70	<b>73</b>
Forbs	9	15	13	14	<b>13</b>	25	50	5	30	<b>28</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	65	85	40	20	<b>53</b>	80	80	95	90	<b>86</b>
Native	1	1	30	10	<b>11</b>	19	15	1	1	<b>9</b>
Seeded	34	14	30	70	<b>37</b>	1	5	4	9	<b>5</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	25	12	12	35	<b>21</b>	10	15	60	25	<b>28</b>
Bare Soil	65	80	75	50	<b>68</b>	70	65	20	60	<b>54</b>
Litter	5	3	3	5	<b>4</b>	10	5	10	8	<b>8</b>
Rock>1 cm	5	5	7	10	<b>7</b>	8	15	10	7	<b>10</b>
Cryptogams	0.5	0	3	0.5	<b>1</b>	2	0.5	0.5	0	<b>1</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	25	0	2	30	<b>14</b>

**Table 12 cont. Cover data for individual plots and transect means, JH-Dr and JH-I**

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	Jericho Highway Burned/ Drilled					Jericho Highway Intact: Unburned/Untreated				
	Dr-P1	Dr-P2	Dr-P3	Dr-P4	Mean	I-P1	I-P2	I-P3	I-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	55	55	65	50	<b>56</b>	50	70	55	35	<b>53</b>
Bare Soil	35	38	28	43	<b>36</b>	25	10	20	25	<b>20</b>
Litter	5	2	2	2	<b>3</b>	15	5	5	15	<b>10</b>
Rock>1 cm	5	5	5	5	<b>5</b>	5	10	15	15	<b>11</b>
Cryptogams	0	0	0	0	<b>0</b>	5	5	5	10	<b>6</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	50	0	0	20	<b>18</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	1	0	1	<b>1</b>
Shrubs	0.5	0.5	0	0	<b>0</b>	45	48	60	59	<b>53</b>
Grasses	60	60	80	90	<b>73</b>	50	50	40	40	<b>45</b>
Forbs	40	40	20	10	<b>28</b>	5	1	0.5	0.5	<b>2</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	75	15	85	10	<b>46</b>	50	75	65	40	<b>58</b>
Native	0.5	0	10	55	<b>16</b>	50	25	35	60	<b>43</b>
Seeded	25	85	5	35	<b>38</b>	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	45	60	65	40	<b>53</b>	55	8	35	3	<b>15</b>
Bare Soil	45	35	28	50	<b>40</b>	0	35	20	39	<b>31</b>
Litter	5	1	2	5	<b>3</b>	45*	14	15	20	<b>16</b>
Rock>1 cm	5	4	5	5	<b>5</b>	0	35	25	18	<b>26</b>
Cryptogams	0	0	0	0	<b>0</b>	0*	8	5	20	<b>11</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	100*	0	0	0	<b>0</b>

\* Beneath vascular plant cover , there was actually about 100% litter cover, underlain by 100% cryptogam cover.

**Table 12 cont. Cover data for individual plots and transect means, JH-BNS**

Jericho Highway--Burned/ Not Seeded/ Not Chained							
	BNS-P1	BNS-P2	BNS-P3	BNS-P4	BNS-P5	BNS-P6	Mean
Understory Cover by Type (Total=100%)							
Vascular Plants	35	20	50	75	50	50	47
Bare Soil	45	60	37	4	35	37	36
Litter	10	10	10	20	5	5	10
Rock>1 cm	10	10	3	1	10	8	7
Cryptogams	0.5	0.5	0.5	0	0	0.5	0
Overstory Cover (%)							
Dead/Live Trees	0	20	0	8	15	1	7
Relative Composition of Vascular Plant Cover (Total=100%)							
Trees	0	0	0	0	0	0.5	0
Shrubs	0	0	0	0	0	0.5	0
Grasses	98	95	95	75	99	98	93
Forbs	2	5	5	25	1	2	7
Relative Composition of Grass Cover (Total=100%)							
Exotic	80	98	100	100	98	95	95
Native	15	2	0.5	0.5	2	5	4
Seeded	5	0.5	0.5	0	0	0	1
Meter-square Subsample: Understory Cover by Type (Total=100%)							
Vascular Plants	50	40	10	80	85	45	52
Bare Soil	40	50	80	4	10	45	38
Litter	5	5	9	15	4	5	7
Rock>1 cm	5	5	1	1	1	5	3
Cryptogams	0	0	0	0	0	0	0
Meter-square Subsample: Overstory Cover (%)							
Dead/Live Trees	0	0	0	0	0	0	0

**Table 13. Cover data for individual plots and transect means, DS-C and DS-NC**

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	Dog Valley Slopes Burned/ Seeded/ Chained					Dog Valley Slopes Burned/ Not Seeded/ Not Chained				
	C-P1	C-P2	C-P3	C-P4	Mean	NC-P1	NC-P2	NC-P3	NC-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	25	30	25	35	<b>29</b>	20	20	20	10	<b>18</b>
Bare Soil	50	30	40	25	<b>36</b>	40	25	45	50	<b>40</b>
Litter	10	15	15	20	<b>15</b>	10	30	5	10	<b>14</b>
Rock>1 cm	15	25	20	20	<b>20</b>	30	25	30	30	<b>29</b>
Cryptogams	on rocks	on rocks	on rocks	on rocks	<b>0</b>	on rocks	on rocks	on rocks	on rocks	<b>0</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	5	15	20	25	<b>16</b>	5	20	40	10	<b>19</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	0.5	0.5	0.5	1	<b>1</b>	5	5	1	1	<b>3</b>
Grasses	95	98	90	80	<b>91</b>	70	65	50	80	<b>66</b>
Forbs	5	2	10	19	<b>9</b>	25	30	49	19	<b>31</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	5	1	5	35	<b>12</b>	5	0.5	25	5	<b>9</b>
Native	15	49	60	45	<b>42</b>	65	95	40	95	<b>74</b>
Seeded	80	50	35	20	<b>46</b>	30	5	35	0	<b>18</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	20	20	25	30	<b>24</b>	20	10	15	15	<b>15</b>
Bare Soil	45	50	40	30	<b>41</b>	40	15	35	40	<b>33</b>
Litter	25	5	10	10	<b>13</b>	10	15	5	10	<b>10</b>
Rock>1 cm	10	25	25	30	<b>23</b>	30	60	45	35	<b>43</b>
Cryptogams	0	0	0 on rocks		<b>0</b>	0 on rocks	on rocks	on rocks	on rocks	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	10	0	0	50	<b>15</b>	0	0	25	0	<b>6</b>

**Table 14. Cover data for individual plots and transect means, PB-C and PB-NC**

	Paul Bunyan's Woodpile Burned/ Seeded/ Chained					Paul Bunyan's Woodpile Burned/ Not Seeded/ Not Chained				
	C-P1	C-P2	C-P3	C-P4	Mean	NC-P1	NC-P2	NC-P3	NC-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	20	30	10	15	<b>19</b>	35	25	20	10	<b>23</b>
Bare Soil	60	50	55	65	<b>58</b>	35	50	65	70	<b>55</b>
Litter	10	10	5	15	<b>10</b>	5	5	5	10	<b>6</b>
Rock>1 cm	10	10	30	5	<b>14</b>	25	20	10	10	<b>16</b>
Cryptogams	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	15	5	2	5	<b>7</b>	10	20	20	30	<b>20</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	1	0.5	1	40	<b>11</b>	0	0.5	1	0.5	<b>1</b>
Grasses	80	80	25	25	<b>53</b>	45	40	50	20	<b>39</b>
Forbs	19	20	74	35	<b>37</b>	55	60	49	80	<b>61</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	5	5	95	0	<b>26</b>	45	35	45	100	<b>56</b>
Native	15	20	5	0.5	<b>10</b>	50	40	55	0	<b>36</b>
Seeded	80	75	0	100	<b>64</b>	5	25	0	0	<b>8</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	10	30	15	15	<b>18</b>	20	25	65	0.5	<b>28</b>
Bare Soil	75	45	50	35	<b>51</b>	45	60	20	80	<b>51</b>
Litter	10	5	5	35	<b>14</b>	5	5	10	10	<b>8</b>
Rock>1 cm	5	20	30	15	<b>18</b>	30	10	5	10	<b>14</b>
Cryptogams	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	1	20	<b>5</b>	0	50	0	20	<b>18</b>

**Table 15. Cover data for individual plots and transect means, RR-C and RR-NC**

	Railroad Burned/ Seeded/ Chained					Railroad Burned/ Not Seeded/ Not Chained				
	C-P1	C-P2	C-P3	C-P4	Mean	NC-P1	NC-P2	NC-P3	NC-P4	Mean
<b>Understory Cover by Type (Total=100%)</b>										
Vascular Plants	65	65	60	65	<b>64</b>	75	70	70	60	<b>69</b>
Bare Soil	29	27	30	25	<b>28</b>	15	20	22	30	<b>22</b>
Litter	5	7	8	10	<b>8</b>	10	8	8	10	<b>9</b>
Rock>1 cm	0.5	1	2	0.5	<b>1</b>	0.5	0.5	0.5	0	<b>0</b>
Cryptogams	1	0	0	0	<b>0</b>	0	2	0	0	<b>1</b>
<b>Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	0	0.5	0	0	<b>0</b>
<b>Relative Composition of Vascular Plant Cover (Total=100%)</b>										
Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>
Shrubs	1	0.5	1	1	<b>1</b>	0	0.5	0	0	<b>0</b>
Grasses	95	95	85	90	<b>91</b>	95	95	95	95	<b>95</b>
Forbs	4	5	14	9	<b>8</b>	5	5	5	5	<b>5</b>
<b>Relative Composition of Grass Cover (Total=100%)</b>										
Exotic	55	60	80	70	<b>66</b>	92	92	94	95	<b>93</b>
Native	15	2	10	5	<b>8</b>	5	5	3	4	<b>4</b>
Seeded	30	38	10	25	<b>26</b>	3	3	3	1	<b>3</b>
<b>Meter-square Subsample: Understory Cover by Type (Total=100%)</b>										
Vascular Plants	50	25	20	45	<b>35</b>	80	30	80	80	<b>68</b>
Bare Soil	40	65	70	40	<b>54</b>	15	55	10	15	<b>24</b>
Litter	10	7	10	15	<b>11</b>	5	15	10	5	<b>9</b>
Rock>1 cm	0.5	3	0.5	0	<b>1</b>	0	0	0	0	<b>0</b>
Cryptogams	0	0	dead	0	<b>0</b>	0	0	0	0	<b>0</b>
<b>Meter-square Subsample: Overstory Cover (%)</b>										
Dead/Live Trees	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>